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# Strategic bombing during World War II

**Strategic bombing during World War II** was the sustained aerial attack on railways, harbours, cities, workers' housing, and industrial districts in enemy territory during World War II. Strategic bombing is a military strategy which is distinct from both close air support of ground forces and tactical air power.<sup>[13]</sup>

During World War II, it was believed by many military strategists of air power that major victories could be won by attacking industrial and political infrastructure, rather than purely military targets.<sup>[14]</sup> Strategic bombing often involved bombing areas inhabited by civilians and some campaigns were deliberately designed to target civilian populations in order to terrorize and disrupt their usual activities. International law at the outset of World War II did not specifically forbid aerial bombardment of cities despite the prior occurrence of such bombing during World War I, the Spanish Civil War, and the Second Sino-Japanese War.

Strategic bombing during World War II began on 1 September 1939 when Germany invaded Poland and the Luftwaffe (German Air Force) began bombing cities and the civilian population in Poland in an indiscriminate aerial bombardment campaign.<sup>[15]</sup> As the war continued to expand, bombing by both the Axis and the Allies increased significantly. The RAF began bombing Germany in March 1940.<sup>[16]</sup> In September 1940, the Luftwaffe began targeting British cities in 'The Blitz'.<sup>[17]</sup> After the beginning of Operation Barbarossa in June 1941, the Luftwaffe attacked Soviet cities and infrastructure. From 1942 onward, the British bombing campaign against Germany became less restrictive and increasingly targeted industrial sites and eventually, civilian areas.<sup>[18][19]</sup> When the United States began flying bombing missions against Germany, it reinforced these efforts and controversial firebombings were carried out against Hamburg (1943), Dresden (1945), and other German cities.<sup>[20]</sup>

In the Pacific War, the Japanese bombed civilian populations throughout the war (e.g. in Chongqing). The US air raids on Japan began in earnest in October 1944<sup>[21]</sup> and by March 1945 had started their escalation into widespread firebombing, which culminated in the atomic bombings of Hiroshima and Nagasaki on 6 and 9 August 1945, respectively.

## Strategic bombing during World War II

Part of World War II



A B-24 on a bomb run over the Astra Romana refinery in Ploiești, Romania, during Operation Tidal Wave<sup>[1]</sup>

<b>Location</b>	European Theatre of World War II Pacific Theatre of World War II
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## Belligerents

	United States		Germany
	United Kingdom		Japan
	Canada		Italy
	Australia		
	Soviet Union		
	China		

## Commanders and leaders

	Hap Arnold		Hermann Göring
	Carl Spaatz		Albert Kesselring
	Curtis LeMay		Kurt Student
	Charles Portal		Hugo Sperrle
	Richard Peirse		Naruhiko Higashikuni
	Arthur Harris		Mitsuo Fuchida
	Arthur Tedder		Masakazu Kawabe
	Clifford McEwen		Chūichi Nagumo
	Sergei Khudyakov		Rino Corso Fougier
	Alexander Novikov		

The effect of strategic bombing was highly debated during and after the war.<sup>[22][23][24][25]</sup> Both the *Luftwaffe* and RAF failed to deliver a knockout blow by destroying enemy morale. However some argued that strategic bombing of non-military targets could significantly reduce enemy industrial capacity and production<sup>[26][27]</sup> and in the opinion of its interwar period proponents, the surrender of Japan vindicated strategic bombing.<sup>[28]</sup>

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 Alexander Golovanov
 Francesco Pricolo  Ettore Muti

### Casualties and losses

#### Britain:

- 60,000 civilians killed<sup>[2]</sup>
- 160,000 airmen (Europe)<sup>[3][4]</sup>

#### China:

- 260,000–351,000 Chinese civilians<sup>[5][6]</sup>

#### France:

- 67,000 civilians killed<sup>[7]</sup>

#### The Netherlands:

- Thousands of civilians

#### Poland:

- Tens of thousands of civilians

#### USSR:

- More than 500,000 Soviet civilians<sup>[8]</sup>
- 2,700 airmen (Japan)<sup>[9]</sup>

#### Germany:

- 353,000–635,000 civilians killed, including foreign workers<sup>[2][10]</sup>
- Very heavy damage to industry

#### Japan:

- 330,000–500,000 civilians killed<sup>[11]</sup>
- Very heavy damage to industry

#### Italy:

- 60,000–100,000 civilians killed<sup>[12]</sup>
- 5,000 soldiers killed<sup>[12]</sup>
- Heavy damage to industry

The Hague Conventions of 1899 and 1907, which address the codes of wartime conduct on land and at sea, were adopted before the rise of air power. Despite repeated diplomatic attempts to update international humanitarian law to include aerial warfare, it was not updated before the outbreak of World War II. The absence of specific international humanitarian law did not mean aerial warfare was not covered under the laws of war, but rather that there was no general agreement of how to interpret those laws.<sup>[29]</sup> This means that aerial bombardment of civilian areas in enemy territory by all major belligerents during World War II was not prohibited by positive or specific customary international humanitarian law.<sup>[30]</sup>

Many reasons exist for the absence of international law regarding aerial bombing in World War II.<sup>[31]</sup> Most nations had refused to ratify such laws or agreements because of the vague or impractical wording in treaties such as the 1923 Hague Rules of Air Warfare. Also, the major powers' possession of newly developed advanced bombers was a great military advantage; they would not accept any negotiated limitations regarding this new weapon. In the absence of specific laws relating to aerial warfare, the belligerents' aerial forces at the start of World War II used the 1907 Hague Conventions — signed and ratified by most major powers — as the customary standard to govern their conduct in warfare, and these conventions were interpreted by both sides to allow the indiscriminate bombing of enemy cities throughout the war.<sup>[32]</sup>

General Telford Taylor, Chief Counsel for War Crimes at the Nuremberg Trials, wrote that:

If the first badly bombed cities — Warsaw, Rotterdam, Belgrade, and London — suffered at the hands of the Germans and not the Allies, nonetheless the ruins of German and Japanese cities were the results not of reprisal but of deliberate policy, and bore witness that aerial bombardment of cities and factories has become a recognized part of modern warfare as carried out by all nations.<sup>[32]</sup>

Article 25 of the 1899 and 1907 Hague Conventions on Land Warfare also did not provide a clear guideline on the extent to which civilians may be spared; the same can be held for naval forces. Consequently, cyclical arguments, such as those advanced by Italian general and air power theorist Giulio Douhet, do not appear to violate any of the Convention's provisions.<sup>[33]</sup> Due to these reasons, the Allies at the Nuremberg and Tokyo Trials never criminalized aerial bombardment of non-combatant targets and Axis leaders who ordered a similar type of practice were not prosecuted. Chris Jochnick and Roger Normand in their article *The Legitimation of Violence 1: A Critical History of the Laws of War* explains that: "By leaving out morale bombing and other attacks on civilians unchallenged, the Tribunal conferred legal legitimacy on such practices."<sup>[34]</sup>

## Europe

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### Policy at the start of the war

Before World War II began, the rapid pace of aviation technology created a belief that groups of bombers would be capable of devastating cities. For example, British Prime Minister Stanley Baldwin warned in 1932, "The bomber will always get through".

When the war began on 1 September 1939 with Germany's invasion of Poland, Franklin D. Roosevelt, President of the neutral United States, issued an appeal to the major belligerents (Britain, France, Germany, and Poland) to confine their air raids to military targets, and "under no circumstances undertake bombardment from the air of civilian populations in unfortified cities"<sup>[35]</sup> The British and French agreed to abide by the request, with the British reply undertaking to "confine bombardment to strictly military objectives upon the understanding that these same rules of warfare will be scrupulously

observed by all their opponents".<sup>[36]</sup> Germany also agreed to abide by Roosevelt's request and explained the bombing of Warsaw as within the agreement because it was supposedly a fortified city—Germany did not have a policy of targeting enemy civilians as part of their doctrine prior to World War II.<sup>[37][38]</sup>

The British Government's policy was formulated on 31 August 1939: if Germany initiated unrestricted air action, the RAF "should attack objectives vital to Germany's war effort, and in particular her oil resources". If the Luftwaffe confined attacks to purely military targets, the RAF should "launch an attack on the German fleet at Wilhelmshaven" and "attack warships at sea when found within range".<sup>[39]</sup> The government communicated to their French allies the intention "not to initiate air action which might involve the risk of civilian casualties"<sup>[40]</sup>

While it was acknowledged bombing Germany would cause civilian casualties, the British government renounced deliberate bombing of civilian property, outside combat zones, as a military tactic.<sup>[41]</sup> The British changed their policy on 15 May 1940, one day after the German bombing of Rotterdam, when the RAF was given permission to attack targets in the Ruhr Area, including oil plants and other civilian industrial targets which aided the German war effort, such as blast furnaces that at night were self-illuminating. The first RAF raid on the interior of Germany took place on the night of 15/16 May 1940 while the Battle of France was still continuing.<sup>[42]</sup>

## Early war in Europe

### Poland

During the German invasion of Poland, the Luftwaffe engaged in massive air raids against Polish cities,<sup>[44]</sup> bombing civilian infrastructure<sup>[44][45]</sup> such as hospitals<sup>[43][44]</sup> and targeting fleeing refugees.<sup>[46][47][48][49]</sup> Notably, the Luftwaffe bombed Warsaw, Wieluń, and Frampol. It has been claimed that the bombing of Frampol was an experiment as according to Polish historians Paweł Puzio and Ryszard Jasinski it had no targetable industry and no military units were stationed there.

In his book, *Eyes on the Sky*, Wolfgang Schreyer wrote:

Frampol was chosen as an experimental object, because test bombers, flying at low speed, weren't endangered by AA fire. Also, the centrally placed town hall was an ideal orientation point for the crews. We watched possibility of orientation after visible signs, and also the size of village, what guaranteed that bombs nevertheless fall down on Frampol. From one side it should make easier the note of probe, from second side it should confirm the efficiency of used bombs.



Bombing of Wieluń, the first Polish city destroyed by Luftwaffe bombing, on 1 September 1939. In one of the first acts of World War II, German bombers destroyed 75% of all the buildings, including a clearly marked hospital and church, killing approximately 1,200 civilians.<sup>[43]</sup>

The directives issued to the Luftwaffe for the Polish Campaign were to prevent the Polish Air Force from influencing the ground battles or attacking German territory.<sup>[50]</sup> In addition, it was to support the advance of German ground forces through direct tactical and indirect air support with attacks against Polish mobilisation centres and thus delay an orderly Polish strategic concentration of forces and to deny mobility for Polish reinforcements through the destruction of strategic Polish rail routes.<sup>[50]</sup>



Polish mothers with their newborn infants in a makeshift maternity ward inside a hospital basement during the Bombing of Warsaw by the German *Luftwaffe*.

Preparations were made for a concentrated attack (Operation *Wasserkante*) by all bomber forces against targets in Warsaw.<sup>[50]</sup> However, the operation was cancelled, according to Polish professor Tomasz Szarota due to bad weather conditions,<sup>[51]</sup> while German author Boog claims it was possibly due to Roosevelt's plea to avoid civilian casualties; according to Boog the bombing of military and industrial targets within the Warsaw residential area called Praga was prohibited.<sup>[52]</sup> Polish reports from the beginning of September note strafing of civilians by German attacks and bombing of cemeteries and marked hospitals (marking of hospitals proved counterproductive as German aircraft began to specifically target them, until hospitals were moved into the open to avoid such targeting), and indiscriminate attacks on fleeing civilians which according to professor Tomasz Szarota was a direct violation of the Hague Convention.<sup>[51]</sup> Warsaw was first attacked by German ground forces on 9 September and was put under siege on 13 September. German author Boog claims that with the arrival of German ground forces, the situation of Warsaw changed; under the Hague Convention, the city could be legitimately attacked as it was a defended city in the front line that refused calls to surrender.<sup>[53]</sup>

The bombing of the rail network, crossroads, and troop concentrations played havoc on

Polish mobilisation, while attacks upon civilian and military targets in towns and cities disrupted command and control by wrecking the antiquated Polish signal network.<sup>[56]</sup> Over a period of a few days, *Luftwaffe* numerical and technological superiority took its toll on the Polish Air Force. Polish Air Force bases across Poland were also subjected to *Luftwaffe* bombing from 1 September 1939.<sup>[57]</sup>

On 13 September, following orders of the *ObdL* to launch an attack on Warsaw's Jewish Quarter, justified as being for unspecified crimes committed against German soldiers but probably in response to a recent defeat by Polish ground troops,<sup>[58]</sup> and intended as a terror attack,<sup>[59]</sup> 183 bomber sorties were flown with 50:50 load of high explosive and incendiary bombs, reportedly set the Jewish Quarter ablaze. On 22 September, Wolfram von Richthofen messaged, "Urgently request exploitation of last opportunity for large-scale experiment as devastation terror raid ... Every effort will be made to eradicate Warsaw completely". His request was rejected.<sup>[59]</sup> However, Hitler issued an order to prevent civilians from leaving the city and to continue with the bombing, which he thought would encourage Polish surrender.<sup>[60]</sup>

On 14 September, the French Air attaché in Warsaw reported to Paris, "the German Air Force acted in accordance to the international laws of war [...] and bombed only targets of military nature. Therefore, there is no reason for French retorsions."<sup>[61]</sup> That day – the Jewish New Year – the Germans concentrated again on the Warsaw's Jewish population, bombing the Jewish quarter and targeting synagogues.<sup>[60]</sup> According to professor Szarota the report was inaccurate – as its author Armengaud didn't know about the most barbaric bombings like those in Wieluń or Kamieniec, left Poland on 12 September, and was motivated by his personal political goal to avoid French involvement in the war, in addition the report published in 1948 rather than in 1939.<sup>[51]</sup>

Three days later, Warsaw was surrounded by the Wehrmacht, and hundreds of thousands of leaflets were dropped on the city, instructing citizens to evacuate the city pending a possible bomber attack.<sup>[63]</sup> On 25 September the *Luftwaffe* flew 1,150 sorties and dropped 560 tonnes of high explosive and 72 tonnes of incendiaries.<sup>[60][64]</sup> (Overall, incendiaries made up only three percent of the total tonnage dropped.)<sup>[53]</sup>



Warsaw burning after a German bombing of the city. The *Luftwaffe* air campaign resulted in the deaths of an estimated 20,000 – 25,000 civilians.<sup>[54][55]</sup>

To conserve the strength of the bomber units for the upcoming Western campaign, the modern He 111 bombers were replaced by Ju 52 transports using "worse than primitive methods" for the bombing.<sup>[64][65][66][67][68]</sup> Due to prevailing strong winds they achieved poor accuracy, even causing some casualties to besieging German troops.<sup>[65][66]</sup>

The only Polish raid against a target in Germany was executed by PZL.23 Karaś light bombers against a factory in Ohlau. The Polish air force left Poland on 18 September 1939 due to the Soviet attack on 17 September 1939, and imminent capture of the Polish airstrips and aircraft stationed in eastern parts of Poland. There was no exception; even Pursuit Brigade, an organic part of the defences of the Polish capital, Warsaw, was transferred to Lublin, one week into the war.



Before (left) and after (right) aerial photographs of the German *Luftwaffe* Bombing of Frampol. The town was completely destroyed.<sup>[62]</sup>

### **The Western Front, 1939 to June 1940**

On 3 September 1939, following the German invasion of Poland, the United Kingdom and France declared war on Germany and the war in the West began. The RAF bombed German warships and light vessels in several harbours on 3 and 4 September.<sup>[69]</sup> Eight German Kriegsmarine men were killed at Wilhelmshaven – the war's first casualties to British bombs;<sup>[70]</sup> attacks on ships at Cuxhaven<sup>[71]</sup> and Heligoland followed.<sup>[72][73]</sup> The 1939 Battle of the Heligoland Bight showed the vulnerability of bombers to fighter attack.

Germany's first strikes were not carried out until 16 and 17 October 1939, against the British fleet at Rosyth and Scapa Flow. Little activity followed.<sup>[74]</sup> Meanwhile, attacks by the Royal Air Force dwindled to less than one a month. As the winter set in, both sides engaged in propaganda warfare, dropping leaflets on the populations below.<sup>[75]</sup> The Phoney War continued.

The British government banned attacks on land targets and German warships in port due to the risk of civilian casualties.<sup>[76]</sup> For the Germans, the earliest directive from the *Luftwaffe* head Hermann Göring permitted restricted attacks upon warships anywhere, as well as upon troop transports at sea.<sup>[77]</sup> However, Hitler's *OKW Direktive Nr 2* and *Luftwaffe Direktive Nr 2*, prohibited attacks upon enemy naval forces unless the enemy bombed Germany first, noting, "the guiding principle must be not to provoke the initiation of aerial warfare on the part of Germany."

After the Altmark Incident, the *Luftwaffe* launched a strike against the British navy yard at Scapa Flow on 16 March 1940, leading to the first British civilian death. A British attack followed three days later against the German airbase at Hörnum on the island of Sylt,<sup>[78]</sup> hitting a hospital, although there were no casualties.<sup>[79]</sup> The Germans retaliated with a naval raid.

German bombing of France began on the night of 9/10 May. By 11 May, the French reported bombs dropped on Henin-Lietard, Bruay, Lens, La Fere, Loan, Nancy, Colmar, Pontoise, Lambersart, Lyons, Bouai, Hasebrouck, Doullens and Abbeville with at least 40 civilians killed.<sup>[80]</sup>

While Allied light and medium bombers attempted to delay the German invasion by striking at troop columns and bridges, the British War Cabinet gave permission for limited bombing raids against targets such as roads and railways west of the Rhine River.<sup>[81][82]</sup> The RAF bombed Mönchengladbach on the evening of 11 May 1940, while Bomber Command attempted to hit roads and rail near the Dutch-German border; four people were killed.<sup>[82][83][84]</sup>

### **Rotterdam Blitz**

The Germans used the threat of bombing Rotterdam to try to get the Dutch to come to terms and surrender. After a second ultimatum had been issued by the Germans, it appeared their effort had failed and on 14 May 1940, *Luftwaffe* bombers were ordered to bomb Rotterdam in an effort to force the capitulation of the besieged city.<sup>[85]</sup> The controversial bombing targeted the centre of the besieged city, instead of providing direct tactical support for the hard-pressed German 22nd Infantry Division (under Lt. Gen. von Sponeck, which had airlanded on 10 May) in combat with Dutch forces northwest of the city, and in the eastern part of the city at the Meuse river bridge.<sup>[86]</sup> At the last minute, the Netherlands decided to submit and sent a plenipotentiary and other negotiators across to German lines. There was an attempt to call off the assault, but the bombing mission had already begun.<sup>[87]</sup> In legal terms, the attack was performed against a defended part of a city vital for the military objectives and in the front-line, and the bombing respected Article 25 to 27 of the Hague Conventions on Land Warfare.<sup>[88]</sup>



Rotterdam's burning city centre shortly after the German bombing, on May 14, 1940.



View of Rotterdam after the German bombing of the city.

Out of 100 Heinkel He 111s, 57 dropped their ordnance, a combined 97 tons of bombs. In the resulting fire 1.1 square miles (2.8 km<sup>2</sup>) of the city centre were devastated, including 21 churches and 4 hospitals. The strike killed between 800–1,000 civilians, wounded over 1,000, and made 78,000 homeless.<sup>[89][90]</sup> Nearly twenty-five thousand homes, 2,320 stores, 775 warehouses and 62 schools were destroyed.<sup>[91]</sup>

Whilst German historian Horst Boog says British propaganda inflated the number of civilian casualties by a factor of 30,<sup>[92]</sup> contemporary newspaper reports show the Dutch legation in Paris initially estimated 100,000 people were killed,<sup>[93]</sup> the Dutch legation in New York later issued a revised figure of 30,000.<sup>[94]</sup> International news agencies widely reported these figures,

portraying Rotterdam as a city mercilessly destroyed by terror bombing without regard for civilian life, with 30,000 dead lying under the ruins.<sup>[83]</sup> Neither claim was true. Furthermore, the bombing was against well-defined targets, albeit in the middle of the city, and would have assisted the advancing German Army.<sup>[83]</sup> The Germans had threatened to bomb Utrecht in the same fashion, and the Netherlands surrendered.<sup>[95][96][97]</sup>

## Allied response

Following the attack on Rotterdam, RAF Bomber Command was authorized to attack German targets east of the Rhine on 15 May 1940; the Air Ministry authorized Air Marshal Charles Portal to attack targets in the Ruhr, including oil plants and other civilian industrial targets which aided the German war effort, such as blast furnaces.<sup>[98][42]</sup> The underlying motive for the attacks was to divert German air forces away from the land front.<sup>[99]</sup> Churchill explained the rationale of his decision to his French counterparts in a letter dated the 16th: "I have examined today with the War Cabinet and all the experts the request which you made to me last night and this morning for further fighter squadrons. We are all agreed that it is better to draw the enemy on to this Island by striking at his vitals, and thus to aid the common cause."<sup>[100]</sup> Due to the inadequate British bomb-sights the strikes that followed "had the effect of terror raids on towns and villages."<sup>[99]</sup> On the night of 15/16 May, 96 bombers crossed the Rhine and attacked targets in Gelsenkirchen. 78 had been assigned oil targets, but only 24 claimed to have accomplished their objective.<sup>[101][102][103]</sup> On the night of 17/18 May, RAF Bomber Command bombed oil installations in Hamburg and Bremen; the H.E. and 400 incendiaries dropped caused six large, one moderately large and 29 small fires. As a result of the attack, 47 people were killed and 127 were wounded.<sup>[104][105]</sup> Railway yards at Cologne were attacked on the same night.<sup>[105]</sup> During May, Essen, Duisburg, Düsseldorf and Hanover were attacked in a similar

fashion by Bomber Command. In June, attacks were made on Dortmund, Mannheim, Frankfurt and Bochum.<sup>[101]</sup> At the time, Bomber Command lacked the necessary navigational and bombing technical background and the accuracy of the bombings during the night attacks was abysmal. Consequently, the bombs were usually scattered over a large area, causing an uproar in Germany. On the night of 7/8 June 1940 a single French Navy Farman F.223 aircraft bombed Berlin, the first Allied attack on the capital.<sup>[106]</sup> The attack was in retaliation for a German bombing of Paris on 3 June.

Despite the British attacks on German cities, the Luftwaffe did not begin to attack military and economic targets in the UK until six weeks after the campaign in France was concluded.<sup>[99]</sup>

## The Battle of Britain and the Blitz



The undamaged St Paul's Cathedral surrounded by smoke and bombed-out buildings and houses in December 1940

On 22 June 1940, France signed an armistice with Germany. Britain was determined to keep fighting. On 1/2 July, the British attacked the German warships Scharnhorst<sup>[107]</sup> and Prinz Eugen<sup>[108]</sup> in the port of Kiel<sup>[109]</sup> and the next day, 16 RAF bombers attacked German train facilities in Hamm.<sup>[110]</sup>

The Battle of Britain began in early June 1940 with small scale bombing raids on Britain. These *Störangriffe* ("nuisance raids") were used to train bomber crews in both day and night attacks, to test defences and try out methods. These training flights continued through July and August, and into the first week of September.<sup>[111]</sup> Hermann Göring's general order, issued on 30 June 1940, stated:

The war against England is to be restricted to destructive attacks against industry and air force targets which have weak defensive forces. ... The most thorough study of the target concerned, that is vital points of the target, is a pre-requisite for success. It is also stressed that every effort should be made to avoid unnecessary loss of life amongst the civilian population.

— Hermann Göring<sup>[112]</sup>

The Kanalkampf of attacks on shipping and fighter skirmishes over the English Channel started on 4 July, and escalated on 10 July, a day which Dowding later proposed as the official start date for the Battle.<sup>[113][114]</sup> Throughout the battle, Hitler called for the British to accept peace, but they refused to negotiate.<sup>[115][116]</sup>

Still hoping that the British would negotiate for peace, Hitler explicitly prohibited attacks on London and against civilians.<sup>[99]</sup> Any airmen who, intentionally or unintentionally, violated this order were punished.<sup>[99]</sup> Hitler's No. 17 Directive, issued 1 August 1940, established the conduct of war against Britain and specifically forbade the *Luftwaffe* from conducting terror raids. The Führer declared that terror attacks could only be a means of reprisal, as ordered by him.<sup>[117]</sup>

On 6 August Göring finalised plans for "Operation Eagle Attack" with his commanders: destruction of RAF Fighter Command across the south of England was to take four days, then bombing of military and economic targets was to systematically extend up to the Midlands until daylight attacks could proceed unhindered over the whole of Britain, then a major attack was to be made on London causing a crisis with refugees when the intended Operation Sea Lion invasion was due to begin.<sup>[118][119]</sup> On 8 August 1940, the Germans switched to raids on RAF fighter bases.<sup>[120]</sup> To reduce losses, the *Luftwaffe* also began to use increasing numbers of bombers at night.<sup>[121]</sup> From the night of 19/20 August night bombing targeted the aircraft industry, ports, harbours, and other strategic targets in towns and cities, including suburban areas

around London.<sup>[122]</sup> By the last week of August, over half the missions were flown under the cover of dark. On 24 August, fate took a turn, and several off-course German bombers accidentally bombed central areas of London.<sup>[123][124][125]</sup> The next day, the RAF bombed Berlin for the first time, targeting Tempelhof airfield and the Siemens factories in Siemenstadt.<sup>[126]</sup> These attacks were seen by the Germans as indiscriminate due to their inaccuracy, and this infuriated Hitler;<sup>[127][128][129]</sup> he ordered that the 'night piracy of the British' be countered by a concentrated night offensive against the island, and especially London.<sup>[130]</sup> In a public speech in Berlin on 4 September 1940, Hitler announced that:

The other night the English had bombed Berlin. So be it. But this is a game at which two can play. When the British Air Force drops 2000 or 3000 or 4000 kg of bombs, then we will drop 150 000, 180 000, 230 000, 300 000, 400 000 kg on a single night. When they declare they will attack our cities in great measure, we will eradicate their cities. The hour will come when one of us will break – and it will not be National Socialist Germany!

— Adolf Hitler<sup>[131]</sup>

The Blitz was underway.<sup>[132]</sup> Göring – at Kesselring's urging and with Hitler's support- turned to a massive assault on the British capital.<sup>[17]</sup> On 7 September 318 bombers from the whole KG 53 supported by eight other *Kampfgruppen*, flew almost continuous sorties against London, the dock area which was already in flames from earlier daylight attacks.<sup>[130]</sup> The attack of 7 September 1940 did not entirely step over the line into a clear terror bombing effort since its primary target was the London docks, but there was clearly an assumed hope of terrorizing the London population.<sup>[17]</sup> Hitler himself hoped that the bombing of London would terrorize the population into submission. He stated that "If eight million [Londoners] go mad, it might very well turn into a catastrophe!". After that he believed "even a small invasion might go a long way".<sup>[133]</sup> Another 250 bomber sorties were flown in the night. By the morning of 8 September 430 Londoners had been killed. The *Luftwaffe* issued a press notice announcing they had dropped more than 1,000,000 kilograms of bombs on London in 24 hours. Many other British cities were hit in the nine-month Blitz, including Plymouth, Birmingham, Liverpool, Southampton, Manchester, Bristol, Belfast, Cardiff, Clydebank, Kingston upon Hull and Coventry. Basil Collier, author of 'The Defence of the United Kingdom', the HMSO's official history, wrote:

Although the plan adopted by the *Luftwaffe* early September had mentioned attacks on the population of large cities, detailed records of the raids made during the autumn and the winter of 1940–41 does not suggest that indiscriminate bombing of the civilians was intended. The points of aim selected were largely factories and docks. Other objectives specifically allotted to bomber-crews included the City of London and the governmental quarter round Whitehall.

— Basil Collier<sup>[134]</sup>

In addition to the conclusions of Basil Collier to that effect there are also, for example, the 1949 memoirs of General Henry H. Arnold who had been in London in 1941 and supported Collier's estimate. Harris noted in 1947 that the Germans had failed to take the opportunity to destroy English cities by concentrated incendiary bombing.<sup>[135]</sup>



German *Luftwaffe* Heinkel He 111 bomber flying over Wapping and the Isle of Dogs in the East End of London at the start of the *Luftwaffe*'s evening raids of 7 September 1940

As the war continued, an escalating war of electronic technology developed. To counter German radio navigation aids, which helped their navigators find targets in the dark and through cloud cover, the British raced to work out the problems with countermeasures (most notably airborne radar, as well as highly effective deceptive beacons and jammers).<sup>[136]</sup>

Despite causing a great deal of damage and disrupting the daily lives of the civilian population, the bombing of Britain failed to have an impact. British air defenses became more formidable, and attacks tapered off as Germany abandoned its efforts against Britain and focused more on the Soviet Union.

Operation Abigail Rachel was the bombing of Mannheim the "first deliberate terror raid" on Germany on 16 December.<sup>[137]</sup> The British had been waiting for the opportunity to experiment with such a raid aimed at creating a maximum of destruction in a selected town since the summer of 1940, and the opportunity was given after the German raid on Coventry.<sup>[137]</sup> Internally it was declared to be a reprisal for Coventry and Southampton.<sup>[137]</sup> The new bombing policy was officially ordered by Churchill at the start of December, on condition it receive no publicity and be considered an experiment.<sup>[137]</sup> Target marking and most bombs missed the city centre.<sup>[138]</sup> This led to the development of the bomber stream.<sup>[137]</sup> Despite the lack of decisive success of this raid, approval was granted for further Abigails.<sup>[137]</sup>

This was the start of a British drift away from precision attacks on military targets and towards area bombing attacks on whole cities.<sup>[139]</sup>



"Children in the east end of London, made homeless by the random bombs of the Nazi night raiders, waiting outside the wreckage of what was their home". September 1940 (National Archives)

## Germany later in the war



A captured Heinkel He 177A in French Armee de l'Air colors in 1945

Goering's first chief of staff Generalleutnant Walther Wever was a big advocate of the Ural bomber programm, but when he died in a flying accident in 1936, support for the strategic bomber programm began to dwindle rapidly under Goering's influences. Under pressure from Goering, Albert Kesselring, Wever's replacement, opted for a medium, all-purpose and twin-engine tactical bomber. Erdhard Milch, who strongly supported Goering conceptions, was instrumental in the Luftwaffe's future. Milch believed that the German industry only had the raw materials and capacity to produce 1,000 four-engine heavy bombers, but many times that number of a twin-engine one. In spring of 1937, just in moment when the Luftwaffe's own Technical Office had passed the Ju-89 and

Do-19 heavy bombers models ready for testing, Goering ordered a halt to all work on the four-engine strategic bomber programm.<sup>[140]</sup> However, in 1939 the Bomber B program sought to produce a twin-engined strategic bomber that could carry nearly-equivalent bombloads of Allied four-engined heavy bombers, but as an advanced development of the pre-war Schnellbomber concept. The Bomber B designs meant to achieve top level speeds of at least 600 km/h (370 mph). The Bomber B program went nowhere, as the intended designs required pairs of combat-reliable aviation engines of at least 1,500 kW (2,000 PS) apiece, something that the German aviation engine industry had serious problems in developing. A further design program initiated in the late spring of 1942, intended for the Luftwaffe to have trans-Atlantic ranged four-engined (and later six-engined) bombers to attack the continental United States and aptly named the Amerika Bomber, also went nowhere, with only five prototype airframes getting airborne for testing from two design competitors, before the war's end.

The only heavy bomber design that would see service with the *Luftwaffe* in World War II was the trouble-prone Heinkel He 177A, which had also been mistakenly meant by the RLM to have a medium angle "dive bombing" capability from the design's start in November 1937, something which Ernst Heinkel and Erhard Milch had vehemently disagreed with, which would not be rescinded until September 1942 by Goering himself.<sup>[141]</sup> The He 177A went into service in April 1942, despite an ongoing series of engine fires in the prototype series of aircraft, and the small batch of A-0 series production prototypes leading up to that timeframe – a serious enough deficiency, along with numerous, seriously deficient design features – to lead *Reichsmarschall Hermann Göring* to decry the He 177A's pair of Daimler-Benz DB 606 powerplants to be nothing more than fire-prone, cumbersome "welded-together engines" in August of that year.<sup>[142]</sup> Production of the B-series by Heinkel's only subcontractor for the *Greif*, Arado Flugzeugwerke, would not have started until November 1944, because of Arado's focus on the production of its own Arado Ar 234 jet-powered reconnaissance-bomber at the time.<sup>[143]</sup> The July 1944-initiated Jägernotprogramm, as well as the devastating effects of Allied bombing on the entire German aviation industry, prevented any production of the He 177B design.

As the He 177As entered service in April 1942, following a destructive RAF attack on the Hanseatic medieval city of Lübeck, Adolf Hitler ordered the *Luftwaffe* to retaliate, leading to the so-called Baedeker Blitz:<sup>[144]</sup>

The Führer has ordered that the air war against England be given a more aggressive stamp. Accordingly, when targets are being selected, preference is to be given to those where attacks are likely to have the greatest possible effect on civilian life. Besides raids on ports and industry, terror attacks of retaliatory nature are to be carried out against towns other than London. Minelaying is to be scaled down in favour of these attacks.

— Signal from the Führer's headquarters to the *Luftwaffe* High Command, 14 April 1942.<sup>[144][145]</sup>



One of the victims of a German V-2 rocket that struck Teniers Square, Antwerp, Belgium on 27 November 1944



Aftermath of V-2 bombing at Battersea, London, 27 January 1945.

In January 1944, a beleaguered Germany tried to strike a blow to British morale with terror bombing with Operation Steinbock, nicknamed the "Baby Blitz" by the British. At this stage of the war, Germany was critically short of heavy and medium bombers, with the added obstacles of a highly effective and sophisticated British air-defence system, and the increasing vulnerability of airfields in occupied Western Europe to Allied air attack making the effectiveness of German retaliation more doubtful.

However, German scientists had invented vengeance weapons – V-1 flying bombs and V-2 ballistic missiles – and these were used to launch an aerial assault on London and other cities in southern England from continental Europe. The campaign was much less destructive than the Blitz, so the British called it 'the Baby Blitz'. As the Allies advanced across France and towards Germany from the West, Paris, Liège, Lille and Antwerp also became targets.

The British and US directed part of the strategic bombing to the eradication of "wonder weapon" threats in what was later known as Operation Crossbow. The development of the V2 was hit preemptively in the British Peenemünde Raid (Operation Hydra) of August 1943.

British historian Frederick Taylor asserts that "all sides bombed each other's cities during the war. Half a million Soviet citizens, for example, died from German bombing during the invasion and occupation of Russia. That's roughly equivalent to the number of German citizens who died from Allied raids".<sup>[8]</sup> The Luftwaffe destroyed numerous Soviet cities through bombing, including Minsk, Sevastopol and Stalingrad. 20,528 tons of bombs were dropped on Sevastopol in June 1942 alone.<sup>[146]</sup> German bombing efforts on the Eastern Front dwarfed its commitments in the west. For example, the Luftwaffe dropped over 100,000 tonnes of bombs upon the Soviet Union from 25 June 1941 to the end of November 1941.<sup>[147]</sup> From January 1942 to the end of December 1943 the Germans dropped 650,400 tonnes of bombs on the Eastern Front, a monthly average of 27,100 tonnes.<sup>[148]</sup>



Minsk in 1941 after German bombing. 85% of the city was completely destroyed.

## The British later in the war

The purpose of the area bombardment of cities was laid out in a British Air Staff paper, dated 23 September 1941:

The ultimate aim of an attack on a town area is to break the morale of the population which occupies it. To ensure this, we must achieve two things: first, we must make the town physically uninhabitable and, secondly, we must make the people conscious of constant personal danger. The immediate aim, is therefore, twofold, namely, to produce (i) destruction and (ii) fear of death.<sup>[151]</sup>

During the first few months of the area bombing campaign, an internal debate within the British government about the most effective use of the nation's limited resources in waging war on Germany continued. Should the Royal Air Force (RAF) be scaled back to allow more resources to go to the British Army and Royal Navy or should the strategic bombing option be followed and expanded? An influential paper was presented to support the bombing campaign by Professor Frederick Lindemann, the British government's leading scientific adviser, justifying the use of area bombing to "dehouse" the German workforce as the most effective way of reducing their morale and affecting enemy war production.<sup>[152]</sup>

Mr. Justice Singleton, a High Court Judge, was asked by Cabinet to look into the competing points of view. In his report, delivered on 20 May 1942, he concluded:

If Russia can hold Germany on land I doubt whether Germany will stand 12 or 18 months' continuous, intensified and increased bombing, affecting, as it must, her war production, her power of resistance, her industries and her will to resist (by which I mean morale).<sup>[153][154][155]</sup>

In the end, thanks in part to the dehousing paper, it was this view which prevailed and Bomber Command would remain an important component of the British war effort up to the end of World War II. A large proportion of the industrial production of the United Kingdom was harnessed to the task of creating a vast fleet of heavy bombers. Until 1944, the effect on German production was remarkably small and raised doubts whether it was wise to divert so much effort—the response being there was nowhere else the effort could have been applied, as readily, to greater effect.

Lindemann was liked and trusted by Winston Churchill, who appointed him the British government's leading scientific adviser with a seat in the Cabinet. In 1942, Lindemann presented the "dehousing paper" to the Cabinet showing the effect that intensive bombing of German cities could produce. It was accepted by the Cabinet, and Air Marshal Harris was appointed to carry out the task. It became an important part of the total war waged against Germany. Professor



The area near the Frankfurt Cathedral after a bombing, May 1945



Cologne in 1945, despite being hit dozens of times by Allied bombs, the Cologne Cathedral survived the war

Lindemann's paper put forward the theory of attacking major industrial centres in order to deliberately destroy as many homes and houses as possible. Working-class homes were to be targeted because they had a higher density and fire storms were more likely. This would displace the German workforce and reduce their ability to work. His calculations (which were questioned at the time, in particular by Professor P. M. S. Blackett of the Admiralty operations research department, expressly refuting Lindemann's conclusions)<sup>[156]</sup> showed the RAF's Bomber Command would be able to destroy the majority of German houses located in cities quite quickly. The plan was highly controversial even before it started, but the Cabinet thought that bombing was the only option available to directly attack Germany (as a major invasion of the continent was almost two years away), and the Soviets were demanding that the Western Allies do something to relieve the pressure on the Eastern Front. Few in Britain opposed this policy, but there were three notable opponents in Parliament, Bishop George Bell and the Labour MPs Richard Stokes and Alfred Salter. No effort to examine the effects of bombing was ever made.<sup>[157]</sup>

On 14 February 1942, the Area bombing directive was issued to Bomber Command. Bombing was to be "focused on the morale of the enemy civil population and in particular of the industrial workers." Though it was never explicitly declared, this was the nearest that the British got to a declaration of unrestricted aerial bombing – Directive 22 said "You are accordingly authorised to use your forces without restriction", and then listing a series of primary targets which included Dortmund, Essen, Duisburg, Düsseldorf, and Cologne. Secondary targets included Braunschweig, Lübeck, Rostock, Bremen, Kiel, Hanover, Frankfurt, Mannheim, Stuttgart, and Schweinfurt. The directive stated that "operations should now be focused on the morale of the enemy civilian population, and in particular, the industrial workers". Lest there be any confusion, Sir Charles Portal wrote to Air Chief Marshal Norman Bottomley on 15 February "...I suppose it is clear that the aiming points will be the built-up areas, and not, for instance, the dockyards or aircraft factories". Factories were no longer targets.<sup>[158]</sup>

RAF estimates of destruction of "built up areas" of major German cities<sup>[149][150]</sup>  
\* = population over 500,000

City	percent destroyed
<u>Berlin*</u>	<b>33%</b>
<u>Cologne*</u>	<b>61%</b>
<u>Dortmund*</u>	<b>54%</b>
<u>Dresden*</u>	<b>59%</b>
<u>Düsseldorf*</u>	<b>64%</b>
<u>Essen*</u>	<b>50%</b>
<u>Frankfurt*</u>	<b>52%</b>
<u>Hamburg*</u>	<b>75%</b>
<u>Leipzig*</u>	<b>20%</b>
<u>Munich*</u>	<b>42%</b>
<u>Bochum</u>	<b>83%</b>
<u>Bremen</u>	<b>60%</b>
<u>Chemnitz</u>	<b>41%</b>
<u>Dessau</u>	<b>61%</b>
<u>Duisburg</u>	<b>48%</b>
<u>Hagen</u>	<b>67%</b>
<u>Hanover</u>	<b>60%</b>
<u>Kassel</u>	<b>69%</b>
<u>Kiel</u>	<b>50%</b>
<u>Mainz</u>	<b>80%</b>
<u>Magdeburg</u>	<b>41%</b>
<u>Mannheim</u>	<b>64%</b>
<u>Nuremberg</u>	<b>51%</b>
<u>Stettin</u>	<b>53%</b>
<u>Stuttgart</u>	<b>46%</b>

The first true practical demonstrations were on the night of 28 to 29 March 1942, when 234 aircraft bombed the ancient Hanseatic port of Lübeck. This target was chosen not because it was a significant military target, but because it was expected to be particularly susceptible – in Harris's words it was "built more like a fire lighter than a city". The ancient timber structures burned well, and the raid destroyed most of the city's centre. A few days later, Rostock suffered the same fate.

At this stage of the air war, the most effective and disruptive examples of area bombing were the "thousand-bomber raids". Bomber Command was able by organization and drafting in as many aircraft as possible to assemble very large forces which could then attack a single area, overwhelming the defences. The aircraft would be staggered so that they would arrive over the target in succession: the new technique of the "bomber stream".

On 30 May 1942, between 0047 and 0225 hours, in Operation Millennium 1,046 bombers dropped over 2,000 tons of high explosive and incendiaries on the medieval town of Cologne, and the resulting fires burned it from end to end. The damage inflicted was extensive. The fires could be seen 600 miles away at an altitude of 20,000 feet. Some 3,300 houses were destroyed, and 10,000 were damaged. 12,000 separate fires raged destroying 36 factories, damaging 270 more, and leaving 45,000 people with nowhere to live or to work. Only 384 civilians and 85 soldiers were killed, but thousands evacuated the city. Bomber Command lost 40 bombers.

Two further thousand-bomber raids were conducted over Essen and Bremen, but neither so utterly shook both sides as the scale of the destruction at Cologne and Hamburg. The effects of the massive raids using a combination of blockbuster bombs (to blow off roofs) and incendiaries (to start fires in the exposed buildings) created firestorms in some cities. The most extreme examples of which were caused by Operation Gomorrah, the attack on Hamburg (45,000 dead), attack on Kassel (10,000 dead), the attack on Darmstadt (12,500 dead), the attack on Pforzheim (21,200 dead), the attack on Swinemunde (23,000 dead) and the attack on Dresden (25,000 dead).



An Avro Lancaster over Hamburg.



An elderly woman in front of the bodies of school children in Cologne, Germany, after a bombing raid

According to economic historian Adam Tooze, in his book *The Wages of Destruction: The Making and Breaking of the Nazi Economy*, a turning point in the bomber offensive was reached in March 1943, during the Battle of the Ruhr. Over five months 34,000 tons of bombs were dropped. Following the raids, steel production fell by 200,000 tons, making a shortfall of 400,000 tons. Speer acknowledged that the RAF were hitting the right targets, and raids severely disrupted his plans to increase production to meet increasing attritional needs. Between July 1943 and March 1944 there were no further increases in the output of aircraft.<sup>[159]</sup>

The bombing of Hamburg in 1943 also produced impressive results. Tiger tank production, and the manufacture of 88mm guns, the most potent dual-purpose artillery piece in the Wehrmacht was "set back for months". On top of this, some 62 percent of the population was dehoused causing more difficulties. However, RAF Bomber Command allowed itself to be distracted by Harris' desire for a war winning blow, and attempted the fruitless missions to destroy Berlin and end the war by spring, 1944.<sup>[160]</sup>

In October 1943, Harris urged the government to be honest with the public regarding the purpose of the bombing campaign. To Harris, his complete success at Hamburg confirmed the validity and necessity of his methods, and he urged that:

the aim of the Combined Bomber Offensive...should be unambiguously stated [as] the destruction of German cities, the killing of German workers, and the disruption of civilized life throughout Germany.<sup>[161][162]</sup>

... the destruction of houses, public utilities, transport and lives, the creation of a refugee problem on an unprecedented scale, and the breakdown of morale both at home and at the battle fronts by fear of extended and intensified bombing, are accepted and intended aims of our bombing policy. They are not by-products of attempts to hit factories.<sup>[163]</sup>

By contrast, the United States Strategic Bombing Survey found attacks on waterways, beginning 23 September with strikes against the Dortmund-Ems Canal and Mittelland Canal, produced tremendous traffic problems on the Rhine River. It had immediate impacts on shipments of goods, and especially coal deliveries, upon which Germany's economy depended; with no more additional effort, by February 1945, rail transport (which competed for coal) had seen its shipments cut by more than half, and by March, "except in limited areas, the coal supply had been eliminated."<sup>[164]</sup>

The devastating bombing raids of Dortmund at the 12th March 1945 with 1,108 aircraft – 748 Lancasters, 292 Halifaxes, 68 Mosquitos – was a record attack on a single target in the whole of World War II. More than 4,800 tonnage of bombs was dropped through the city centre and the south of the city and destroyed 98% of buildings.<sup>[165]</sup>

### Other British efforts

Operation Chastise, better known as the Dambusters raid, was an attempt to damage German industrial production by crippling its hydro-electric power and transport in the Ruhr area. Operation Hydra of August 1943 sought to destroy German work on long-range rockets but only delayed it by a few months. Subsequent efforts were directed against V-weapon launch sites in France.

## US bombing in Europe



Dresden, 1945, view from the city hall (Rathaus) over the destroyed city

In mid 1942, the United States Army Air Forces (USAAF) arrived in the UK and carried out a few raids across the English Channel. The USAAF Eighth Air Force's B-17 bombers were called the "Flying Fortresses" because of their heavy defensive armament of ten to twelve machine guns — eventually comprising up to thirteen heavy 12.7 mm calibre, "light barrel" Browning M2 guns per bomber — and armor plating in vital locations. In part because of their heavier armament and armor, they carried smaller bomb loads than British bombers. With all of this, the USAAF's commanders in Washington, D.C., and in Great Britain adopted the strategy of taking on the Luftwaffe head on, in larger and larger air raids by mutually defending bombers, flying over Germany, Austria, and France at high altitudes during the daytime. Also, both the U.S. Government and its Army Air Forces commanders were reluctant to bomb enemy cities and towns indiscriminately. They claimed that by using the B-17 and the Norden bombsight, the USAAF should be able to carry out "precision

bombing" on locations vital to the German war machine: factories, naval bases, shipyards, railroad yards, railroad junctions, power plants, steel mills, airfields, etc.

In January 1943, at the Casablanca Conference, it was agreed RAF Bomber Command operations against Germany would be reinforced by the USAAF in a Combined Operations Offensive plan called Operation Pointblank. Chief of the British Air Staff MRAF Sir Charles Portal was put in charge of the "strategic direction" of both British and American bomber operations. The text of the Casablanca directive read: "Your primary object will be the progressive destruction and dislocation of the German military, industrial, and economic system and the undermining of the morale of the German people to a point where their capacity for armed resistance is fatally weakened."<sup>[167]</sup> At the beginning of the combined strategic bombing offensive on 4 March 1943, 669 RAF and 303 USAAF heavy bombers were available.

In late 1943, the 'Pointblank' attacks manifested themselves in the infamous Schweinfurt raids (first and second). Formations of unescorted bombers were no match for German fighters, which inflicted a deadly toll. In despair, the Eighth halted air operations over Germany until a long-range fighter could be found in 1944; it proved to be the P-51 Mustang, which had the range to fly to Berlin and back.

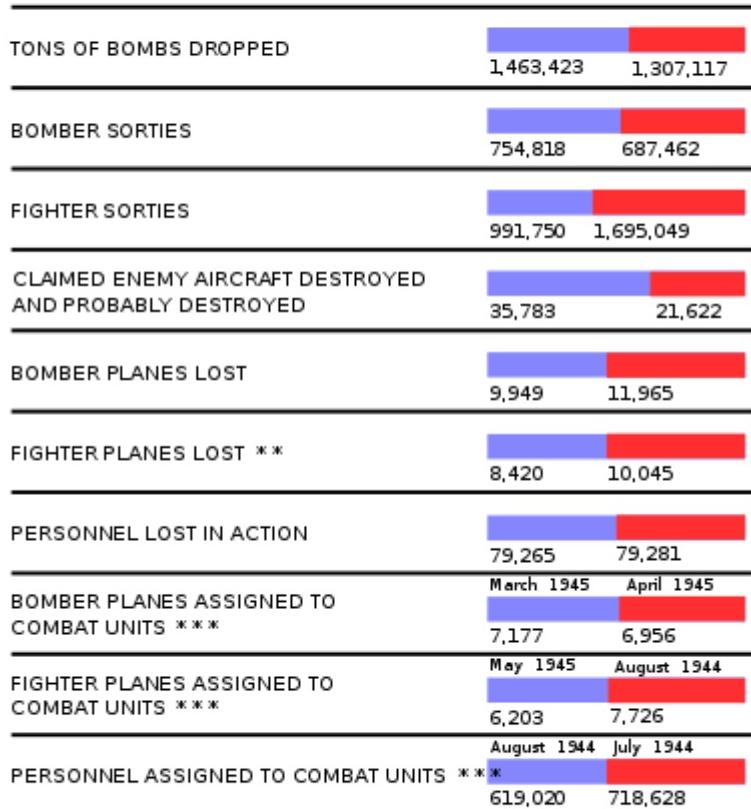
USAAF leaders firmly held to the claim of "precision bombing" of military targets for much of the war, and dismissed claims they were simply bombing cities. However the American Eighth Air Force received the first H2X radar sets in December 1943. Within two weeks of the arrival of these first six sets, the Eighth command gave permission for them to area bomb a city using H2X and would continue to authorize, on average, about one such attack a week until the end of the war in Europe.<sup>[168]</sup>

In reality, the day bombing was "precision bombing" only in the sense that most bombs fell somewhere near a specific designated target such as a railway yard. Conventionally, the air forces designated as "the target area" a circle having a radius of 1,000 feet (300m) around the aiming point of attack. While accuracy improved during the war, Survey studies show that, overall, only about 20% of the bombs aimed at precision targets fell within this target area.<sup>[169]</sup> In the fall of 1944, only seven percent of all bombs dropped by the Eighth Air Force hit within 1,000 feet of their aim point.

## THE BOMBING EFFORT

### STATISTICAL SUMMARY

UNITED STATES ARMY AIR FORCES    ROYAL AIR FORCE \*



\* All Royal Air Force statistics quoted in this report are preliminary or tentative

\*\* Includes fighter bombers and reconnaissance planes

\*\*\* Maximum strength of each air force

Summary of AAF and RAF bombing .<sup>[166]</sup>

Nevertheless, the sheer tonnage of explosive delivered by day and by night was eventually sufficient to cause widespread damage, and, more importantly from a military point of view, forced Germany to divert resources to counter it. This was to be the real significance of the Allied strategic bombing campaign—resource allocation.



A pile of bodies in Dresden before cremation



A raid by the 8th Air Force on the Focke Wulf factory at Marienburg, Germany (1943).

For the sake of improving USAAF firebombing capabilities, a mock-up German Village was built up and repeatedly burned down. It contained full-scale replicas of German residential homes. Firebombing attacks proved quite successful, in a series of attacks in July 1943 on Hamburg, roughly 50,000 civilians were killed and large areas of the city destroyed.

With the arrival of the brand-new Fifteenth Air Force based in Italy, command of the U.S. Air Forces in Europe was consolidated into the United States Strategic Air Forces (USSTAF). With the addition of the Mustang to its strength — and a major change in fighter tactics by the Eighth Air Force, meant to secure daylight air supremacy for the Americans over Germany from the start of 1944 onwards — the Combined Bomber Offensive was resumed. Planners targeted the Luftwaffe in an operation known as 'Big Week' (20–25 February 1944) and succeeded brilliantly — its major attacks came during the "Baby Blitz" period for the Luftwaffe over England, while losses for the Luftwaffe's day fighter forces were so heavy that both the twin-engined Zerstörergeschwader heavy fighter wings (the intended main anti-bomber force) and their replacement, single-engined Sturmgruppen of heavily armed Fw 190As became largely ineffective, clearing each force of bomber destroyers in their turn from Germany's skies throughout most of 1944. With such heavy losses of their primary means of defense against the USAAF's tactics, German planners were forced into a hasty dispersal of industry, with the day fighter arm never being able to fully recover in time.

On 27 March 1944, the Combined Chiefs of Staff issued orders granting control of all the Allied air forces in Europe, including strategic bombers, to General

Dwight D. Eisenhower, the Supreme Allied Commander, who delegated command to his deputy in SHAEF Air Chief Marshal Arthur Tedder. There was resistance to this order from some senior figures, including Winston Churchill, Harris, and Carl Spaatz, but after some debate, control passed to SHAEF on 1 April 1944. When the Combined Bomber Offensive officially ended on 1 April, Allied airmen were well on the way to achieving air superiority over all of Europe. While they continued some strategic bombing, the USAAF along with the RAF turned their attention to the tactical air battle in support of the Normandy Invasion. It was not until the middle of September that the strategic bombing campaign of Germany again became the priority for the USSTAF.<sup>[170]</sup>

The twin campaigns—the USAAF by day, the RAF by night—built up into massive bombing of German industrial areas, notably the Ruhr, followed by attacks directly on cities such as Hamburg, Kassel, Pforzheim, Mainz and the often-criticized bombing of Dresden.

## Bombing in Italy

Italy, first as an Axis member and later as a German-occupied country, was heavily bombed by Allied forces for all the duration of the war. In Northern Italy, after small-scale bombings which mainly targeted factories, only causing little damage and casualties, RAF Bomber Command launched a first large-scale area bombing campaign on Milan, Turin and Genoa (the so-called 'industrial triangle') during the autumn of 1942. All three cities suffered heavy damage and hundreds

on civilian casualties, although the effects were less disastrous than those suffered by German cities, mainly because Italian cities had centers made of brick and stone buildings, while German cities had centers made of wooden buildings. Milan and Turin were bombed again in February 1943; the heaviest raids were carried out in July (295 bombers dropped 763 tons of bombs on Turin, killing 792 people) and August (all three cities were bombed and a total of 843 bombers dropped 2,268 tons of bombs over Milan, causing about 900 casualties). These attacks caused widespread damage and prompted most of the cities' inhabitants to flee. During 1944 and 1945 Milan, Turin and Genoa were instead bombed by USAAF bombers, which mainly targeted factories and marshalling yards; nonetheless, imprecision in bombings caused further destruction of vast areas. By the end of the war, about 30–40% of the buildings in each of the three cities were destroyed, and both in Milan and Turin less than half of the city remained undamaged.<sup>[171][172]</sup> 2,069 people were killed in Turin<sup>[173]</sup> and over 2,200 in Milan. The only other city in Italy to be subjected to area bombing was La Spezia, heavily bombed by the Bomber Command during April 1943, with slight casualties but massive damage (45% of the buildings were destroyed or heavily damaged,<sup>[174]</sup> and just 25–30% remained undamaged). Several other cities in Northern Italy suffered heavy damage and casualties due to USAAF bombings, usually aimed at factories and marshalling yards but often inaccurate; among them Bologna (2,481 casualties<sup>[175]</sup>), Padua (about 2,000 casualties<sup>[176]</sup>), Rimini (98% of the city was destroyed or damaged<sup>[177]</sup>), Treviso (1,600 killed in the bombing of 7 April 1944, 80% of the city destroyed or damaged<sup>[178]</sup>), Trieste (463 casualties on 10 June 1944<sup>[179]</sup>), Vicenza (317 casualties on 18 November 1944).

In Southern Italy, after small-scale bombings by the RAF (more frequent than in the North), USAAF started its bombing campaign in December 1942. The bombings mostly targeted harbour facilities, marshalling yards, factories and airports, but the inaccuracy of the attacks caused extensive destruction and civilian casualties; among the cities hit the hardest were Naples (6,000 casualties<sup>[180]</sup>), Messina (more than one third of the city was destroyed,<sup>[181]</sup> and only 30% remained untouched), Reggio Calabria, Foggia (thousands of casualties), Cagliari (416 inhabitants were killed in the bombings of February 1943, 80% of the city was damaged or destroyed), Palermo, Catania and Trapani (70% of the buildings were damaged or destroyed<sup>[182]</sup>).

Central Italy was left untouched for the first three years of war, but from 1943 onwards it was heavily bombed by USAAF, with heavy damage (usually due to inaccuracy in bombing) to a number of cities, including Livorno (57% of the city was destroyed or damaged, over 500 people were killed in June 1943), Civitavecchia, Grosseto, Terni (1,077 casualties<sup>[183]</sup>), Pisa (1,738 casualties<sup>[184]</sup>), Pescara (between 2,200 and 3,900 casualties), Ancona (1,182 casualties<sup>[185]</sup>), Viterbo (1,017 casualties<sup>[186]</sup>) and Isernia (about 500 casualties on 11 September 1943). Rome was bombed on several occasions; the historic centre and the Vatican were spared, but the suburbs suffered heavy damage and between 3,000 and 5,000 casualties. Florence also suffered some bombings in the outskirts (215 people were killed on 25 September 1943), while the historical centre was not bombed. Venice proper was never bombed.

In Dalmatia, the Italian enclave of Zara suffered extensive bombing, which destroyed 60% of the city and killed about 1,000 of its 20,000 inhabitants, prompting most of the population to flee to mainland Italy (the town was later annexed to Yugoslavia).

Except for Rome, Venice, Florence, Urbino and Siena, damage to cultural heritage in Italy was widespread.



Building destroyed in Milan after the August 1943 bombings. Milan Cathedral is visible in the background.

## Bombing in France

German-occupied France contained a number of important targets that attracted the attention of the British, and later American bombing. In 1940, RAF Bomber Command launched attacks against German preparations for [Operation Sealion](#), the proposed invasion of England, attacking Channel Ports in France and Belgium and sinking large numbers of barges that had been collected by the Germans for use in the invasion.<sup>[187]</sup> France's Atlantic ports were important bases for both German surface ships and submarines, while French industry was an important contributor to the German war effort.<sup>[188]</sup>

Before 1944, the Allies bombed targets in France that were part of the German war industry. This included raids such as those on the [Renault](#) factory in [Boulogne-Billancourt](#) in March 1942 or the port facilities of [Nantes](#) in September 1943 (which killed 1,500 civilians). In preparation of Allied [landings in Normandy](#) and [those in the south of France](#), French infrastructure (mainly rail transport) was intensively targeted by RAF and USAAF in May and June 1944. Despite intelligence provided by the [French Resistance](#), many residential areas were hit in error or lack of accuracy. This included cities like [Marseille](#) (2,000 dead), [Lyon](#) (1,000 dead), [Saint-Étienne](#), [Rouen](#), [Orléans](#), [Grenoble](#), [Nice](#), Paris surrounds, and so on. The [Free French Air Force](#), operational since 1941, used to opt for the more risky skimming tactic when operating in national territory, to avoid civilian casualties. On 5 January 1945, British bombers struck the "Atlantic pocket" of Royan and destroyed 85% of this city. A later raid, using [napalm](#) was carried out before it was freed from Nazi occupation in April. Of the 3,000 civilians left in the city, 442 died.

French civilian casualties due to Allied strategic bombing are estimated at about half of the 67,000 French civilian dead during Allied operations in 1942–1945; the other part being mostly killed during tactical bombing in the Normandy campaign. 22% of the bombs dropped in Europe by British and American air forces between 1940 and 1945 were in France.<sup>[189]</sup> The port city of [Le Havre](#) had been destroyed by 132 bombings during the war (5,000 dead) until September 1944. It has been rebuilt by architect [Auguste Perret](#) and is now a [World Heritage Site](#).

## Soviet strategic bombing

The first Soviet offensive bomber campaign was directed against the [Romanian oilfields](#) in the summer of 1941.<sup>[190]</sup> In response to a German raid on Moscow on the night of 21–22 July 1941, [Soviet Naval Aviation](#) launched a series of seven raids against Germany, primarily Berlin, between the night of 7–8 August and 3–4 September. These attacks were undertaken by between four and fifteen aircraft—beginning on 11 August the new [Tupolev TB-7](#)—from the island of [Saaremaa](#), base of the [1st Torpedo Air Regiment](#).<sup>[190]</sup> (At least one raid of the [81st Air Division](#) took off from [Pushkin](#).) Besides thirty tonnes of bombs, they also dropped leaflets with [Joseph Stalin's](#) defiant speech of 3 July. The Soviets sent a total of 549 long-range bombers over German territory in all of 1941.<sup>[190]</sup>

In March 1942 the strategic bombing arm of the Soviet Union was reorganized as the [Long Range Air Force \(ADD\)](#). It raided Berlin from 26–29 August and again on the night of 9–10 September with 212 planes.<sup>[190]</sup> It raided [Helsinki](#) for the first time on 24 August, [Budapest](#) on 4–5 and 9–10 September and [Bucharest](#) on 13–14 September. The German-occupied Polish cities of [Kraków](#) and [Warsaw](#) were not exempt, but the bombers concentrated primarily on military targets.<sup>[190]</sup> There were 1,114 sorties over Germany in 1942. In March 1943 there was a strategic shift: in preparation for the [Kursk Offensive](#), the bombers were directed against the German railroads behind the front.<sup>[190]</sup> In April the Long Range Air Force expanded to eight air corps and eleven independent divisions containing 700 planes. After the Kursk preparations, the Soviets turned their attention to administrative and industrial targets in [East Prussia](#) in April. With 920 aircraft taking part, they dropped 700 tonnes of bombs there. The largest Soviet bomb of the war, an 11,000-pound weapon, was dropped on [Königsberg](#) during one of these raids.<sup>[190]</sup>

Throughout 1943, the Soviets attempted to give the impression of cooperation between their bombers and those of the West.<sup>[190]</sup> In February 1944, they again shifted priority, this time towards [terror bombing](#), with the goal of knocking Finland and Hungary out of the war.<sup>[190]</sup> Helsinki was struck by 733 bombers on the night of 6–7 February, by 367 on the

15–16th and 850 on the 25–26th. A total of 2,386 tonnes of bombs were dropped.<sup>[190]</sup> Budapest was hit four straight nights from 13–20 September with a total of 8,000 tonnes by 1,129 bombers. The Soviets flew 4,466 sorties into enemy territory in the year 1944. In December the Long Range Air Force was reorganized as the 18th Air Army.<sup>[190]</sup>

The main task of the 18th Air Army was to support the final offensive against Germany, but it also undertook raids against Berlin, Breslau, Danzig and Königsberg.<sup>[190]</sup> In total, 7,158 Soviet aircraft dropped 6,700 tonnes of bombs on Germany during the war, a modest 3.1% of Soviet bomber sorties, a mere 0.5% of all Allied "strategic" sorties against German-occupied territory and a measly 0.2% of all bombs dropped on it.<sup>[190]</sup>

After the war, Marxist historians in the Soviet Union and East Germany claimed that the Soviet strategic bombing campaign was limited by moral qualms over bombing civilian centres.<sup>[190]</sup> One early bombing theorist, Vasili Chripin, whose theories influenced the Soviet Union's first strategic bombing guidelines (1936) and the service regulations of 26 January 1940, drew back from terror bombing as advocated by Western theorists.<sup>[190]</sup> The Spanish Civil War also convinced Soviet war planners that the air force was most effective when used in close cooperation with ground forces. Nonetheless, after the war, Marshal Vasili Sokolovsky admitted that the Soviets would have gladly launched a strategic bombing offensive had they the capability.<sup>[190]</sup> In reality, the Soviets never geared aircraft production towards long-range bombers, beyond the small force of indigenously designed and produced Petlyakov Pe-8 four-engined "heavies", and so never had enough to mount an effective campaign. The land-based nature of warfare on the Eastern Front also required closer cooperation between the air forces and ground troops than did, for example, the defence of Great Britain.<sup>[190]</sup>

## Effectiveness

Strategic bombing has been criticized on practical grounds because it does not work predictably. The radical changes it forces on a targeted population can backfire, including the counterproductive result of freeing inessential labourers to fill worker shortages in war industries.<sup>[23]</sup>

Much of the doubt about the effectiveness of the bomber war comes from the fact German industrial production increased throughout the war.<sup>[24]</sup> A combination of factors helped increase German war material output, these included; continuing development from production lines started before the war, limiting competing models of equipment, government enforced sharing of production techniques, a change in how contracts were priced and an aggressive worker suggestion program. At the same time production plants had to deal with a loss of experienced workers to the military, assimilating untrained workers, culling workers incapable of being trained, and utilizing unwilling forced labor. Strategic bombing failed to reduce German war production. There is insufficient information to ascertain how much additional potential industrial growth the bombing campaign may have curtailed.<sup>[25]</sup> However, attacks on the infrastructure were taking place. The attacks on Germany's canals and railroads made transportation of materiel difficult.<sup>[22]</sup>

The Oil Campaign of World War II was, however, extremely successful and made a very large contribution to the general collapse of Germany in 1945. In the event, the bombing of oil facilities became Albert Speer's main concern; however, this occurred sufficiently late in the war that Germany would soon be defeated in any case.

German insiders credit the Allied bombing offensive with crippling the German war industry. Speer repeatedly said (both during and after the war) it caused crucial production problems. Admiral Karl Dönitz, head of the U-boat fleet (U-waffe), noted in his memoirs failure to get the revolutionary Type XXI U-boats (which could have completely altered the balance of power in the Battle of the Atlantic) into service was entirely the result of the bombing. The United States Strategic Bombing Survey (Europe), says, despite bombing becoming a major effort, between December 1942 and June 1943, "The attack on the construction yards and slipways was not heavy enough to be more than troublesome" and the delays in

delivery of Type XXIs and XXIIIs up until November 1944 "cannot be attributed to the air attack",<sup>[22]</sup> but adds, "The attacks during the late winter and early spring of 1945 did close, or all but close, five of the major yards, including the great Blohm and Voss plant at Hamburg".<sup>[22]</sup>

## Effect on morale

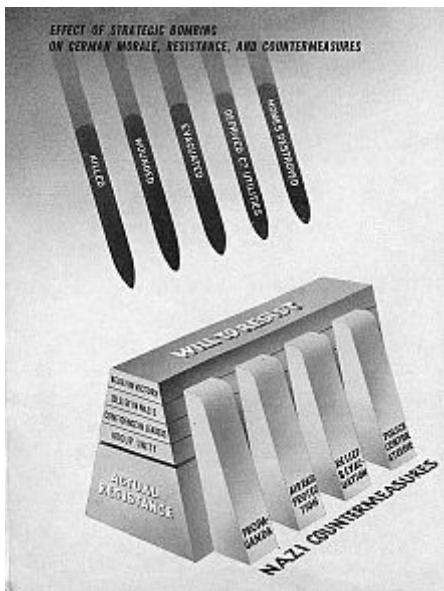


Diagram showing the effects of strategic bombing on German morale in 1945. From the United States Strategic Bombing Survey, Morale Division.

Although designed to "break the enemy's will", the opposite often happened. The British did not crumble under the German Blitz and other air raids early in the war. British workers continued to work throughout the war and food and other basic supplies were available throughout.

The impact of bombing on German morale was significant according to Professor John Buckley. Around a third of the urban population under threat of bombing had no protection at all. Some of the major cities saw 55–60 percent of dwellings destroyed. Mass evacuations were a partial answer for six million civilians, but this had a severe impact on morale as German families were split up to live in difficult conditions. By 1944, absenteeism rates of 20–25 percent were not unusual and in post-war analysis 91 percent of civilians stated bombing was the most difficult hardship to endure and was the key factor in the collapse of their own morale.<sup>[191]</sup> The United States Strategic Bombing Survey concluded that the bombing was not stiffening morale but seriously depressing it; fatalism, apathy, defeatism were apparent in bombed areas. The *Luftwaffe* was blamed for not warding off the attacks and confidence in the Nazi regime fell by 14 percent. By the spring of 1944, some 75 percent of Germans believed the war was lost, owing to the intensity of the bombing.<sup>[192]</sup>

Buckley argues the German war economy did indeed expand significantly following Albert Speer's appointment as Reichsminister of Armaments, "but it is spurious to argue that because production increased then bombing had no real impact". The bombing offensive did do serious damage to German production levels. German tank and aircraft production, though reached new records in production levels in 1944, was in particular one-third lower than planned.<sup>[26]</sup> In fact, German aircraft production for 1945 was planned at 80,000, showing Erhard Milch and other leading German planners were pushing for even higher outputs; "unhindered by Allied bombing German production would have risen far higher".<sup>[27]</sup>

Journalist Max Hastings and the authors of the official history of the bomber offensive, Noble Frankland among them, has argued bombing had a limited effect on morale. In the words of the British Bombing Survey Unit (BBSU), "The essential premise behind the policy of treating towns as unit targets for area attack, namely that the German economic system was fully extended, was false." This, the BBSU noted, was because official estimates of German war production were "more than 100 percent in excess of the true figures". The BBSU concluded, "Far from there being any evidence of a cumulative effect on (German) war production, it is evident that, as the (bombing) offensive progressed ... the effect on war production became progressively smaller (and) did not reach significant dimensions."<sup>[193][194]</sup>

## Allied bombing statistics 1939–45

According to the United States Strategic Bombing Survey, Allied bombers between 1939 and 1945 dropped 1,415,745 tons of bombs over Germany (51.1% of the total bomb tonnage dropped by Allied bombers in the European campaign), 570,730 tons over France (20.6%), 379,565 tons over Italy (13.7%), 185,625 tons over Austria, Hungary and the Balkans (6.7%), and 218,873 tons over other countries (7.9%).<sup>[195]</sup>

RAF Bombing Sorties & Losses 1939–45 <sup>[196]</sup>			RAF & USAAF Bomb Tonnages on Germany 1939–45 <sup>[196]</sup>		
	Sorties	Losses	Year	RAF Bomber Command (tons)	US 8th Air Force (tons)
<b>Night</b>	297,663	7,449	<b>1939</b>	31	—
<b>Day</b>	66,851	876	<b>1940</b>	13,033	—
			<b>1941</b>	31,504	—
			<b>1942</b>	45,561	1,561
			<b>1943</b>	157,457	44,165
			<b>1944</b>	525,518	389,119
			<b>1945</b>	191,540	188,573
			<b>Total</b>	964,644	623,418

## Casualties

After the war, the U.S. [Strategic Bombing Survey](#) reviewed the available [casualty](#) records in Germany, and concluded that official German statistics of casualties from air attack had been too low. The survey estimated that at a minimum 305,000 were killed in German cities due to bombing and estimated a minimum of 780,000 wounded. Roughly 7,500,000 German civilians were also rendered homeless (see [dehousing](#)). Overy estimated in 2014 that in all about 353,000 civilians were killed by British and American bombing of German cities.<sup>[197]</sup>

In addition to the minimum figure given in the Strategic bombing survey, the number of people killed by Allied bombing in Germany has been estimated at between 400,000 and 600,000.<sup>[10]</sup> In the UK, 60,595 British were killed by German bombing,<sup>[2]</sup> and in France, 67,078 French were killed by US-UK bombing.<sup>[7]</sup>

Belgrade was heavily bombed by the Luftwaffe on 6 April 1941, when more than 17,000 people were killed.<sup>[198]</sup> According to *The Oxford companion to World War II*, "After Italy's surrender the Allies kept up the bombing of the northern part occupied by the Germans and more than 50,000 Italians were killed in these raids."<sup>[199]</sup> An [Istat](#) study of 1957 stated that 64,354 Italians were killed by aerial bombing, 59,796 of whom were civilians.<sup>[12]</sup> Historians Marco Gioannini and Giulio Massobrio argued in 2007 that this figure is inaccurate due to loss of documents, confusion and gaps, and estimated the total number of civilian casualties in Italy due to aerial bombing as comprised between 80,000 and 100,000.<sup>[200]</sup>

Over 160,000 Allied airmen and 33,700 planes were lost in the [European theatre](#).<sup>[201]</sup>



Civilian casualties in Dresden after allied bombing on the night of February 13, 1945

## Asia

Within Asia, the majority of strategic bombing was carried out by the Japanese and the US. The British Commonwealth planned that once the war in Europe was complete, a strategic bombing force of up to 1,000 heavy bombers ("Tiger Force") would be sent to the Far East. This was never realised before the end of the Pacific War.

## Japanese bombing



Chongqing during a bombing



A famous photo entitled "Bloody Saturday", showing a burned and terrified baby in Shanghai's South Station following an IJN bombing

Japanese strategic bombing was independently conducted by the Imperial Japanese Navy Air Service and the Imperial Japanese Army Air Service. Bombing efforts mostly targeted large Chinese cities such as Shanghai, Wuhan, and Chongqing, with around 5,000 raids from February 1938 to August 1943 in the later case.

The bombing of Nanjing and Canton, which began on 22 and 23 September 1937, called forth widespread protests culminating in a resolution by the Far Eastern Advisory Committee of the League of Nations. Lord Cranborne, the British Under-Secretary of State For Foreign Affairs, expressed his indignation in his own declaration.

Words cannot express the feelings of profound horror with which the news of these raids had been received by the whole civilized world. They are often directed against places far from the actual area of hostilities. The military objective, where it exists, seems to take a completely second place. The main object seems to be to inspire terror by the indiscriminate slaughter of civilians...

— Lord Cranborne<sup>[202]</sup>

There were also air raids on Philippines and northern Australia (Bombing of Darwin, 19 February 1942). The Imperial Japanese Navy Air Service and the Imperial Japanese Army Air Service used tactical bombing against ships, airfields, military positions, and military installations, as the IJNAS had done at the attack on Pearl Harbor.

## Allied bombing of South-East Asia

After the Japanese invasion of Thailand (8 December 1941), the southeast Asian kingdom signed a treaty of alliance with Japan and declared war on the United States and the United Kingdom. The Allies dropped 18,583 bombs on Thailand during the war, resulting in the death of 8,711 people and the destruction of 9,616 buildings.<sup>[203]</sup> The primary target of the campaign was Bangkok, the Thai capital. Rural areas were almost entirely unaffected.<sup>[204]</sup>

In August 1942, the United States Fourteenth Air Force based in southern China undertook the first air raids in French Indochina. The American bombing campaign gained intensity after the surrender of Germany in May 1945, and by July Japanese defences were incapable of impeding their movement. The Americans had attained complete air supremacy.<sup>[205]</sup> After the victory over Japan, on 19 August the denizens of Hanoi broke into the streets and removed the black coverings off the street lamps.<sup>[206]</sup>



Chinese casualties of a mass panic during a June 1941 Japanese aerial bombing of Chongqing.

In 1944–45, the Eastern Fleet of the Royal Navy undertook several raids on the occupied Netherlands East Indies. They also bombed the Japanese-occupied Indian territory of the Andaman and Nicobar Islands.

## United States bombing of Japan

The United States began effective strategic bombing of Japan when B-29s began operating from the Marianas (Guam and Tienan) in late 1944. Prior to that a single raid was launched from carriers in 1942, and ineffective long-range raids were launched from China from June to December 1944. In the last seven months of the campaign, a change to firebombing resulted in great destruction of 67 Japanese cities, as many as 500,000 Japanese deaths and some 5 million more made homeless. Emperor Hirohito's viewing of the destroyed areas of Tokyo in March 1945 is said to have been the beginning of his personal involvement in the peace process, culminating in Japan's surrender five months later.<sup>[208]</sup>

### Conventional bombing

The first U.S. raid on the Japanese main island was the Doolittle Raid of 18 April 1942, when sixteen B-25 Mitchells were launched from the USS Hornet (CV-8) to attack targets including Yokohama and Tokyo and then fly on to airfields in China. The raid was a military pinprick but a significant propaganda victory. Because they were launched prematurely, none of the aircraft had enough fuel to reach their designated landing sites, and so either crashed or ditched (except for one aircraft, which landed in the Soviet Union, where the crew was interned). Two crews were captured by the Japanese.

The key development for the bombing of Japan was the B-29 Superfortress, which had an operational range of 1,500 miles (2,400 km); almost 90% of the bombs (147,000 tons) dropped on the home islands of Japan were delivered by this bomber. The first raid by B-29s on Japan was on 15 June 1944, from China. The B-29s took off from Chengdu, over 1,500 miles away. This raid was also not particularly effective: only forty-seven of the sixty-eight bombers hit the target area.

Raids of Japan from mainland China, called Operation Matterhorn, were carried out by the Twentieth Air Force under XX Bomber Command. Initially the commanding officer of the Twentieth Air Force was Hap Arnold, and later Curtis LeMay. Bombing Japan from China was never a satisfactory arrangement because not only were the Chinese airbases difficult to supply—material being sent by air from India over "the Hump"—but the B-29s operating from them could only reach Japan if they traded some of their bomb load for extra fuel in tanks in the bomb-bays. When Admiral Chester Nimitz's island-hopping campaign captured Pacific islands close enough to Japan to be within the B-29's range, the Twentieth Air Force was assigned to XXI Bomber Command, which organized a much more effective bombing campaign of the Japanese home islands. Based in the Marianas (Guam and Tinian in particular), the B-29s were able to carry their full bomb loads and were supplied by cargo ships and tankers. The first raid from the Mariana was on 24 November 1944, when 88 aircraft bombed Tokyo. The bombs were dropped from around 30,000 feet (10,000 m) and it is estimated that only around 10% hit their targets.

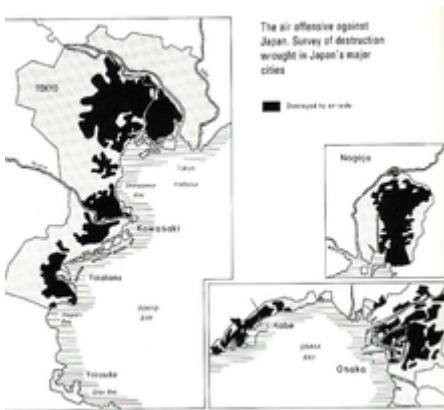
Unlike all other forces in theater, the USAAF Bomber Commands did not report to the commanders of the theaters but directly to the Joint Chiefs of Staff. In July 1945, they were placed under the U.S. Strategic Air Forces in the Pacific, which was commanded by General Carl Spaatz.

As in Europe, the United States Army Air Forces (USAAF) tried daylight precision bombing. However, it proved to be impossible due to the weather around Japan, "during the best month for bombing in Japan, visual bombing was possible for [just] seven days. The worst had only one good day."<sup>[209]</sup> Further, bombs dropped from a great height were tossed about by high winds.

General LeMay, commander of XXI Bomber Command, instead switched to mass firebombing night attacks from altitudes of around 7,000 feet (2,100 m) on the major conurbations. "He looked up the size of the large Japanese cities in the World Almanac and picked his targets accordingly."<sup>[210]</sup> Priority targets were Tokyo, Nagoya, Osaka, and Kobe. Despite limited



Tokyo burns during a firebomb attack 26 May 1945.



Conventional bombs from B-29s destroyed over 40% of the urban area in Japan's six greatest industrial cities

early success, particularly against Nagoya, LeMay was determined to use such bombing tactics against the vulnerable Japanese cities. Attacks on strategic targets also continued in lower-level daylight raids.

The first successful firebombing raid was on Kobe on 3 February 1945, and following its relative success the USAAF continued the tactic. Nearly half of the principal factories of the city were damaged, and production was reduced by more than half at one of the port's two shipyards.

The first raid of this type on Tokyo was on the night of 23–24 February when 174 B-29s destroyed around one square mile ( $3 \text{ km}^2$ ) of the city. Following on that success, as Operation Meetinghouse, 334 B-29s raided on the night of 9–10 March, of which 282 Superforts reached their targets, dropping around 1,700 tons of bombs. Around 16 square miles ( $41 \text{ km}^2$ ) of the city was destroyed and over 100,000 people are estimated to have died in the fire storm. It was the most destructive conventional raid,

and the deadliest single bombing raid of any kind in terms of lives lost, in all of military aviation history,<sup>[211]</sup> even when the missions on Hiroshima and Nagasaki are taken as single events.<sup>[212]</sup> The city was made primarily of wood and paper, and the fires burned out of control. The effects of the Tokyo firebombing proved the fears expressed by Admiral Yamamoto in 1939: "Japanese cities, being made of wood and paper, would burn very easily. The Army talks big, but if war came and there were large-scale air raids, there's no telling what would happen."<sup>[213]</sup>

In the following two weeks, there were almost 1,600 further sorties against the four cities, destroying 31 square miles ( $80 \text{ km}^2$ ) in total at a cost of 22 aircraft. By June, over forty percent of the urban area of Japan's largest six cities (Tokyo, Nagoya, Kobe, Osaka, Yokohama, and Kawasaki) was devastated. LeMay's fleet of nearly 600 bombers destroyed tens of smaller cities and manufacturing centres in the following weeks and months.

Leaflets were dropped over cities before they were bombed, warning the inhabitants and urging them to escape the city. Though many, even within the Air Force, viewed this as a form of psychological warfare, a significant element in the

Conventional bombing damage to Japanese cities in World War II<sup>[207]</sup>

City	% area destroyed
<u>Yokohama</u>	<b>58%</b>
<u>Tokyo</u>	<b>51%</b>
<u>Toyama</u>	<b>99%</b>
<u>Nagoya</u>	<b>40%</b>
<u>Osaka</u>	<b>35.1%</b>
<u>Nishinomiya</u>	<b>11.9%</b>
<u>Shimonoseki</u>	<b>37.6%</b>
<u>Kure</u>	<b>41.9%</b>
<u>Kobe</u>	<b>55.7%</b>
<u>Ōmura</u>	<b>35.8%</b>
<u>Wakayama</u>	<b>50%</b>
<u>Kawasaki</u>	<b>36.2%</b>
<u>Okayama</u>	<b>68.9%</b>
<u>Yahata</u>	<b>21.2%</b>
<u>Kagoshima</u>	<b>63.4%</b>
<u>Amagasaki</u>	<b>18.9%</b>
<u>Sasebo</u>	<b>41.4%</b>
<u>Moji</u>	<b>23.3%</b>
<u>Miyakonojō</u>	<b>26.5%</b>
<u>Nobeoka</u>	<b>25.2%</b>
<u>Miyazaki</u>	<b>26.1%</b>
<u>Ube</u>	<b>20.7%</b>
<u>Saga</u>	<b>44.2%</b>
<u>Imabari</u>	<b>63.9%</b>
<u>Matsuyama</u>	<b>64%</b>
<u>Fukui</u>	<b>86%</b>



The charred remains of a woman and child, after a bombing raid on Tokyo



Charred remains of victims of one of the attacks on Tokyo

decision to produce and drop them was the desire to assuage American anxieties about the extent of the destruction created by this new war tactic. Warning leaflets were also dropped on cities not in fact targeted, to create uncertainty and absenteeism.

A year after the war, the U.S. Strategic Bombing Survey reported that American military officials had underestimated the power of strategic bombing combined with naval blockade and previous military defeats to bring Japan to unconditional surrender without invasion. By July 1945, only a fraction of the planned strategic bombing force had been deployed yet there were few targets left worth the effort. In hindsight, it would have been more effective to use land-based and carrier-based air power to strike merchant shipping

and begin aerial mining at a much earlier date so as to link up with effective submarine anti-shipping campaign and completely isolate the island nation. This would have accelerated the strangulation of Japan and ended the war sooner.<sup>[214]</sup> A postwar Naval Ordnance Laboratory survey agreed, finding naval mines dropped by B-29s had accounted for 60% of all Japanese shipping losses in the last six months of the war.<sup>[215]</sup> In October 1945, Prince Fumimaro Konoe said the sinking of Japanese vessels by U.S. aircraft combined with the B-29 aerial mining campaign were just as effective as B-29 attacks on industry alone,<sup>[216]</sup> though he admitted, "the thing that brought about the determination to make peace was the prolonged bombing by the B-29s." Prime Minister Baron Kantarō Suzuki reported to U.S. military authorities it "seemed to me unavoidable that in the long run Japan would be almost destroyed by air attack so that merely on the basis of the B-29s alone I was convinced that Japan should sue for peace."<sup>[215]</sup>

## Nuclear bombing

While the bombing campaign against Japan continued, the U.S. and its allies were preparing to invade the Japanese home islands, which they anticipated to be heavily costly in terms of life and property. On 1 April 1945, U.S. troops invaded the island of Okinawa and fought there fiercely against not only enemy soldiers, but also enemy civilians. After two and a half months, 12,000 U.S. servicemen, 107,000 Japanese soldiers, and over 150,000 Okinawan civilians (included those forced to fight) were killed. Given the casualty rate in Okinawa, American

City	% area destroyed
Tokushima	85.2%
Sakai	48.2%
Hachioji	65%
Kumamoto	31.2%
Isesaki	56.7%
Takamatsu	67.5%
Akashi	50.2%
Fukuyama	80.9%
Aomori	30%
Okazaki	32.2%
Ōita	28.2%
Hiratsuka	48.4%
Tokuyama	48.3%
Yokkaichi	33.6%
Ujiyamada	41.3%
Ōgaki	39.5%
Gifu	63.6%
Shizuoka	66.1%
Himeji	49.4%
Fukuoka	24.1%
Kōchi	55.2%
Shimizu	42%
Ōmura	33.1%
Chiba	41%
Ichinomiya	56.3%
Nara	69.3%
Tsu	69.3%
Kuwana	75%



The Nagasaki Prefecture Report on the bombing characterized Nagasaki as "like a graveyard with not a tombstone standing".<sup>[217]</sup>



The mushroom cloud of the atomic bombing of Nagasaki, Japan, 1945, rose some 18 km (11 mi) above the hypocentre.

commanders realized a grisly picture of the intended invasion of mainland Japan. When President Harry S. Truman was briefed on what would happen during an invasion of Japan, he could not afford such a horrendous casualty rate, added to over 400,000 U.S. servicemen who had already died fighting in both the European and Pacific theaters of the war.<sup>[217]</sup>

Hoping to forestall the invasion, the United States, the United Kingdom, and the Republic of China issued a Potsdam Declaration on 26 July 1945, demanding that the Japanese government accept an unconditional surrender. The declaration also stated that if Japan did not surrender, it would be faced with "prompt and utter destruction", a process which was already underway with the incendiary bombing raids destroying 40% of targeted cities, and by naval warfare isolating and starving Japan of imported food. The Japanese government ignored (*mokusatsu*) this ultimatum, thus signalling that they were not going to surrender.<sup>[218]</sup>

In the wake of this rejection, Stimson and George Marshall (the Army chief of staff) and Hap Arnold (head of the Army Air Forces) set the atomic bombing in motion.<sup>[219]</sup>

On 6 August 1945, the B-29 bomber Enola Gay flew over the Japanese city of Hiroshima in southwest Honshū and dropped a gun-type uranium-235 atomic bomb (code-named Little Boy by the U.S.) on it. Two other B-29 aircraft were airborne nearby for the purposes of instrumentation and photography. When the planes first approached Hiroshima, Japanese anti-aircraft units in the city initially thought they were reconnaissance aircraft, since they were ordered not to shoot at one or few aircraft that did not pose a threat, in order to conserve their ammunition for large-scale air raids. The bomb killed roughly 90,000–166,000 people; half of these died quickly while the other half suffered lingering deaths.<sup>[220]</sup> The death toll included an estimated 20,000 Korean slave laborers and 20,000 Japanese soldiers) and destroyed 48,000 buildings (including the headquarters of the Second General Army and Fifth Division).<sup>[221]</sup> On 9 August, three days later, the B-29 Bockscar flew over the Japanese city of Nagasaki in northwest Kyushu and dropped an implosion-type, plutonium-239 atomic bomb (code-named Fat Man by the U.S.) on it, again accompanied by two other B-29 aircraft for instrumentation and photography. This bomb effects killed roughly 39,000–80,000 people,<sup>[220]</sup> including roughly 23,000–28,000 Japanese war industry employees, an estimated 2,000 Korean forced workers, and at least 150 Japanese soldiers. The bomb destroyed 60% of the city.<sup>[221][222]</sup> The industrial damage in Nagasaki was high, partly owing to the inadvertent targeting of the industrial zone, leaving 68–80% of the non-dock industrial production destroyed.<sup>[223]</sup>

Six days after the detonation over Nagasaki, Japan announced its surrender to the Allied Powers on 15 August 1945, signing the Instrument of Surrender on 2 September 1945, officially ending the Pacific War and World War II. The two atomic bombings generated strong sentiments in Japan against all nuclear weapons. Japan adopted the Three Non-

City	% area destroyed
Toyohashi	61.9%
Numazu	42.3%
Choshi	44.2%
Kofu	78.6%
Utsunomiya	43.7%
Mito	68.9%
Sendai	21.9%
Tsuruga	65.1%
Nagaoka	64.9%
Hitachi	72%
Kumagaya	55.1%
Hamamatsu	60.3%
Maebashi	64.2%

Nuclear Principles, which forbade the nation from developing nuclear armaments. Across the world anti-nuclear activists have made Hiroshima the central symbol of what they are opposing.<sup>[224]</sup>

## See also

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- Civilian casualties of strategic bombing
- Defense of the Reich, the strategic defensive aerial campaign fought by the German *Luftwaffe* over Germany and German occupied Europe.
- Emergency Fighter Program
- List of Polish cities damaged in World War II
- Bombing of Wiener Neustadt in World War II
- The Blitz

## References

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### Citations

1. Duga, James; Stewart, Carroll (2002). *Ploesti* (<https://books.google.com/?id=KV8Ma-VA6fIC&pg=RA1-PA180>). Brassey's. ISBN 978-1-57488-510-1. Retrieved 26 March 2009.
2. White, Matthew. *Twentieth Century Atlas – Death Tolls: United Kingdom* (<http://users.erols.com/mwhite28/ww2stats.htm>). Retrieved 4 June 2009.
  - 60,000, John Keegan *The Second World War* (1989); "bombing"
  - 60,000: Boris Urlanis, *Wars and Population* (1971)
  - 60,595: Harper Collins Atlas of the Second World War
  - 60,600: John Ellis, *World War II: a statistical survey* (Facts on File, 1993) "killed and missing"
  - 92,673, (incl. 30,248 merchant mariners and 60,595 killed by bombing): *Encyclopædia Britannica*, 15th edition, 1992 printing. "Killed, died of wounds, or in prison .... exclud[ing] those who died of natural causes or were suicides."
  - 92,673: Norman Davies, *Europe A History* (1998) same as Britannica's war dead in most cases
  - 92,673: Michael Clodfelter *Warfare and Armed Conflict: A Statistical Reference to Casualty and Other Figures, 1618–1991*;
  - 100,000: William Eckhardt, a three-page table of his war statistics printed in *World Military and Social Expenditures 1987–88* (12th ed., 1987) by Ruth Leger Sivard. "Deaths", including "massacres, political violence, and famines associated with the conflicts."

The British kept accurate records during World War II SO 60,595 was the official death total with 30,248 for the British merchant mariners (most of whom are listed on the Tower Hill Memorial)
3. Crook, Paul (2003). "Chapter 10 "The case against Area Bombing"". In Peter Hore. *Patrick Blackett: Sailor, Scientist, and Socialist* (<https://books.google.com/?id=5jW14KVVeYU0C&pg=RA1-PA167>). Routledge. p. 176. ISBN 0-7146-5317-9.
4. André Corvisier (1994). *A Dictionary of Military History and the Art of War*, Blackwell Publishing, ISBN 0-631-16848-6. "Germany, air battle (1942–45)" by P. Facon and Stephen J. Harris p. 312 (<https://books.google.com/books?id=nEQ7FUAdmc8C&pg=PA312&lpg=PA312&dq=160,000+bomber+command&source=web&ots=Liy4O9BKJp&sig=4CjKdl6dUq956122J49cCCeTblo&hl=en#PPA312,M1>)
5. Jennifer M. Lind (2010). "*Sorry States: Apologies in International Politics* (<https://books.google.com/books?id=H3usRiqVp-MC&pg=&dq&hl=en#v=onepage&q=&f=false>)". Cornell University Press. p.28. ISBN 0-8014-7628-3
6. R.J. Rummel (31 August 2007). *China's Bloody Century: Genocide and Mass Murder Since 1900*. Transaction Publishers.
7. Olivier Wiewiora, "Normandy: the landings to the liberation of Paris" p.131

8. Hawley, Charles (11 February 2005), "[Dresden Bombing Is To Be Regretted Enormously](http://www.spiegel.de/international/0,1518,341239,00.html)" (<http://www.spiegel.de/international/0,1518,341239,00.html>), *Der Spiegel*
9. Kerr (1991), p. 276
10. German Deaths by aerial bombardment (It is not clear if these totals includes Austrians, of whom about 24,000 were killed (see [Austrian Press & Information Service, Washington, D.C](https://web.archive.org/web/20060420214655/http://www.austria.org/history_rep.shtml) ([https://web.archive.org/web/20060420214655/http://www.austria.org/history\\_rep.shtml](https://web.archive.org/web/20060420214655/http://www.austria.org/history_rep.shtml)) at the [Wayback Machine](#) (archived 20 April 2006)) and other territories in the Third Reich but not in modern Germany)
  - 600,000 about 80,000 were children in [Hamburg, Juli 1943](http://www.spiegel.de/sptv/reportage/0,1518,258062,00.html) (<http://www.spiegel.de/sptv/reportage/0,1518,258062,00.html>) in *Der Spiegel SPIEGEL ONLINE* 2003 (in German)
  - Matthew White [Twentieth Century Atlas – Death Tolls](http://users.erols.com/mwhite28/warstat1.htm) (<http://users.erols.com/mwhite28/warstat1.htm>) lists the following totals and sources:
    - more than 305,000: (1945 [Strategic Bombing Survey](#));
    - 400,000: *Hammond Atlas of the 20th century* (1996)
    - 410,000: [R. J. Rummel](#), 100% [democidal](#);
    - 499,750: [Michael Clodfelter](#) *Warfare and Armed Conflict: A Statistical Reference to Casualty and Other Figures, 1618–1991*;
    - 593,000: [John Keegan](#) *The Second World War* (1989);
    - 593,000: [J. A. S. Grenville](#) citing "official Germany" in *A History of the World in the Twentieth Century* (1994)
    - 600,000: [Paul Johnson](#) *Modern Times* (1983)
11. Matthew White [Twentieth Century Atlas – Death Tolls: Allies bombing of Japan](http://users.erols.com/mwhite28/warstat1.htm#Allies) (<http://users.erols.com/mwhite28/warstat1.htm#Allies>) lists the following totals and sources
  - 330,000: 1945 US Strategic Bombing Survey;
  - 363,000: (not including post-war radiation sickness); [John Keegan](#) *The Second World War* (1989);
  - 374,000: [R. J. Rummel](#), including 337,000 [democidal](#);
  - 435,000: [Paul Johnson](#) *Modern Times* (1983)
  - 500,000: (Harper Collins Atlas of the Second World War)
12. Marco Gioannini, Giulio Massobrio, *Bombardate l'Italia. Storia della guerra di distruzione aerea 1940–1945*, p. 491
13. R.J. Overy, *The Air War. 1939–1945* (1980) pp. 8–14
14. Tami Davis Biddle, "British and American Approaches to Strategic Bombing: Their Origins and Implementation in the World War II Combined Bomber Offensive", *Journal of Strategic Studies* (1995) 18#1 pp 91–144
15. Levine 1992, p. 21 ([https://books.google.com/books?id=LZ99c7ZIxxQC&pg=PA21&lpg=PA21&dq=bombing+of+poland&source=bl&ots=MWYnVPUYV5&sig=jvqXwmmXzimwb2bxpv6KzQExxIs&hl=en&ei=a8QmSv7rG6G-NOiXyYQF&sa=X&oi=book\\_result&ct=result&resnum=8](https://books.google.com/books?id=LZ99c7ZIxxQC&pg=PA21&lpg=PA21&dq=bombing+of+poland&source=bl&ots=MWYnVPUYV5&sig=jvqXwmmXzimwb2bxpv6KzQExxIs&hl=en&ei=a8QmSv7rG6G-NOiXyYQF&sa=X&oi=book_result&ct=result&resnum=8))
16. <http://ww2today.com/the-first-bombing-raid-on-germany>
17. Murray 1983, p. 52.
18. Hastings 1979
19. Garrett 1993
20. Boog 2001, p. 408.
21. Pimlott, John. *B-29 Superfortress* (London: Arms and Armour Press, 1980), p.40.
22. "[United States Strategic Bombing Survey, established by the Secretary of War on 3 November 1944, pursuant to a directive from the late President Roosevelt, 30 September 1945](http://www.anesi.com/ussbs02.htm)" (<http://www.anesi.com/ussbs02.htm>). Anesi.com. Retrieved 1 November 2015.
23. J.K. Galbraith, "The Affluent Society", chapter 12 "The Illusion of National Security", first published 1958. Galbraith was a director of the U.S. Strategic Bombing Survey.
24. Williamson Murray, Allan Reed Millett, "A War To Be Won: fighting the Second World War", p. 319
25. [http://www.econ.yale.edu/growth\\_pdf/cdp905.pdf](http://www.econ.yale.edu/growth_pdf/cdp905.pdf)
26. Buckley 1998, p. 165.

27. Murray 1983, p. 253.
28. Buckley 1998, p. 197.
29. Gómez, Javier Guisández (20 June 1998). "The Law of Air Warfare" (<http://www.icrc.org/web/eng/siteeng0.nsf/iwpList200/42F64C9A4212EA07C1256B66005C0BF1>). *International Review of the Red Cross*. n° 323: 347–63.
30. *Terror from the Sky: The Bombing of German Cities in World War II*. Berghahn Books. 2010. p. 167. ISBN 1-8454-5844-3.
31. Evangeslista, Matthew. "Peace Studies, Volume 3". page 447. Routledge.
32. Sir Arthur Harris (30 November 1995). *Despatch on War Operations: 23rd February 1942 to 8th May 1945*. Routledge. p. 44. ISBN 0-7146-4692-X.
33. Obote-Odora, Alex. "The judging of war criminals: individual criminal responsibility under international law". page 177.
34. *State Crime: Current Perspectives (Critical Issues in Crime and Society)*. Rutgers University Press. 28 September 2010. p. 90. ISBN 0-8135-4901-9.
35. President Franklin D. Roosevelt Appeal against aerial bombardment of civilian populations (<http://www.dannen.com/decision/int-law.html#E>), 1 September 1939
36. Taylor 2005, Chapter "Call Me Meier", p. 105.
37. Nelson (2006), p. 104. ([https://books.google.com/books?id=XCKIXd2H2ykC&pg=PA104&dq=Roosevelt+Hitler+bombing+1939+Warsaw&as\\_brr=3](https://books.google.com/books?id=XCKIXd2H2ykC&pg=PA104&dq=Roosevelt+Hitler+bombing+1939+Warsaw&as_brr=3))
38. Corum, 1995., p. 7
39. "Cabinet Office Records CAB 66/1/19 – The National Archives (United Kingdom)" ([http://www.nationalarchives.gov.uk/documentsonline/details-result.asp?queryType=1&resultcount=1&Edoc\\_Id=7960846](http://www.nationalarchives.gov.uk/documentsonline/details-result.asp?queryType=1&resultcount=1&Edoc_Id=7960846)). nationalarchives.gov.uk. Retrieved 16 April 2017.
40. "Cabinet Office Records CAB 65/1/1- The National Archives (United Kingdom)" ([http://www.nationalarchives.gov.uk/documentsonline/details-result.asp?queryType=1&resultcount=1&Edoc\\_Id=7965267](http://www.nationalarchives.gov.uk/documentsonline/details-result.asp?queryType=1&resultcount=1&Edoc_Id=7965267)). nationalarchives.gov.uk. Retrieved 16 April 2017.</
41. A.C. Grayling (Bloomsbury 2006), p. 24.
42. Taylor 2005, Chapter "Call Me Meier", p. 111.
43. Sylwia Słomińska, "Wieluń, 1 września 1939 r." (<http://www.historia.wielunia.webpark.pl/1wrzesnia2.html>), Z dziejów dawnego Wielunia "History of old Wielun", site by Dr Tadeusz Grabarczyk, Historical Institute at University of Łódź,
44. Bruno Coppievers, N. Fotion, eds. (2002) *Moral constraints on war: principles and cases*, Lexington Books, p 74. (<http://books.google.com/books?id=7pOfmghKXOUC&pg=PA74&dq=World+war+two+targeting+hospitals+Poland>)
45. Bob Golan, Jacob Howland, Bette Howland, (2005). *A long way home*, University Press of America, p 11. (<https://books.google.com/books?id=KOXohD-W8I4C&pg=PA11&dq=Poland+bombing+civilian+buildings>)
46. Norman Davies. (1982). *God's Playground: A History of Poland*, Columbia University Press, p 437. (<https://books.google.com/books?id=WzLADJliGHUC&pg=PA437&dq=Poland+strafing+refugees>)
47. George Topas, (1990). *The iron furnace: a Holocaust survivor's story*, University Press of Kentucky, p 23. (<https://books.google.com/books?id=vgzeKvRV194C&pg=PA23&dq=Poland+bombing+refugees>)
48. Hempel, Andrew. (2000). *Poland in World War II: An Illustrated Military History* ISBN 978-0-7818-0758-6 p 14. (<https://books.google.com/books?id=9SmbqqQfp1gC&pg=PA14&dq=Poland+bombing+refugees>)
49. Hooton 1994, p. 183.
50. Speidel, p. 18
51. Straty Warszawy 1939–1945.Raport pod red. Wojciecha Fałkowskiego, Naloty na Warszawę podczas II wojny światowej Tomasz Szarota, pages 240–281. Warszawa: Miasto Stołeczne Warszawa 2005
52. Boog 2001, p. 360-361.
53. Boog 2001, p. 361.
54. "Czarny poniedziałek" (<http://www.polskieradio.pl/39/156/Artykul/689947,Czarny-poniedzialek-i-630-ton-bomb>). Polskie Radio. 25 September 2012.
55. Der Spiegel *Wir warden sie ausradieren* No. 3 vol. 13, 13 January 2003, p. 123.

56. Hooton 1994, p. 182.
57. Hooton 1994, p. 181.
58. Hooton 1994, p. 186.
59. Hooton 1994, p. 187.
60. Spencer Tucker, Priscilla Mary Roberts, (2004). *Encyclopedia of World War II: a political, social and military history*, ABC-CLIO, p 1613. ([https://books.google.com/books?id=U0xblxV\\_pLgC&pg=RA3-PA1613&dq=terror+bombing+wars+aw](https://books.google.com/books?id=U0xblxV_pLgC&pg=RA3-PA1613&dq=terror+bombing+wars+aw))
61. Poeppel-von Preußen-von Hase, 2000. p. 248.
62. Daniel Blatman, Rachel Grossbaum-Pasternak, Abraham Kleban, Shmuel Levin, Wila Orbach, Abraham Wein. (1999). *Pinkas Hakehillot: Encyclopedia of Jewish Communities, Poland* ([http://www.jewishgen.org/yizkor/pinkas\\_poland/pol7\\_00406.html](http://www.jewishgen.org/yizkor/pinkas_poland/pol7_00406.html)) (English translation) Volume VII, Yad Vashem, pp 406–407.
63. Smith&Creek, 2004. p. 63
64. Hooton 1994, p. 92.
65. Smith&Creek, 2004. pp. 63–64
66. Hooton 1994, p. 188.
67. Poeppel-von Preußen-von Hase, 2000. p. 249.
68. "Electronic Encyclopaedia of Civil Defense and Emergency Management" (<http://www.richmond.edu/~wgreen/ECDwas.html>). richmond.edu. Retrieved 1 November 2015.
69. Richards, Denis, 1953. pp. 38–40
70. "Attacks in 1939" ([http://www.bunkermuseum.de/angriffe\\_1/bomben\\_benachbarte\\_bereiche/bereiche\\_1939.htm](http://www.bunkermuseum.de/angriffe_1/bomben_benachbarte_bereiche/bereiche_1939.htm)) (in German). www.bunkermuseum.de.
71. Vice Admiral a. D. Prof. Friedrich Ruge, Dr. Hellmuth Günther Dahms, Dr. Ernst Schraepler, Dr. Herbert Michaelis, Dr. Walther Hubatsch, (1968). *Der 2. Weltkrieg*, Bertelsmann Lexikon Verlag, Gütersloh, p. 657
72. Richards 1953, p. 38-40
73. "RAF strikes German naval base" (<http://www.onwar.com/chrono/1939/sep39/f04sep39.htm>). www.onwar.com/.
74. Richards 1953, p.67.
75. Smith&Creek, 2004. p. 64
76. Middlebrook, Martin (1985). *The Bomber Command War Diaries* (London: Penguin Books), p.19 ISBN 0-670-80137-2
77. Hooton 1994, p. 190.
78. Richards 1953, p.68.
79. "IN THE AIR: Raid on Sylt" (<http://www.time.com/time/magazine/article/0,9171,885838,00.html>). Time. 1 April 1940. Retrieved 24 May 2010.
80. "The Miami Daily News, Saturday 11 May 1940"
81. Richards 1953, pp.114–115.
82. Legro, Jeffrey (1995). *Cooperation Under Fire: Anglo-German Restraint During World War II* (<https://books.google.com/books?id=Gg5m4bpwWN8C&pg=PA135>). Cornell UP. p. 135.
83. Hinchliffe, 2000. p. 43
84. "60 Jahre Kriegsende – Bombenkrieg" ([http://kriegsende.ard.de/pages\\_std\\_lib/0,3275,OID1093298\\_REF1093298,00.html](http://kriegsende.ard.de/pages_std_lib/0,3275,OID1093298_REF1093298,00.html)). ard.de. Retrieved 16 April 2017.
85. Rutherford, Ward, *Blitzkrieg 1940*, G.P. Putnam's Sons, New York, 1980, p.52.
86. Piekalkiewicz, Janusz, *The Air War, 1939–1945*, Blandford Press, Poole, Dorset, UK, 1985, p.74.
87. DeutschlandRadio Berlin – MerkMal – Der Bombenkrieg in Europa (<http://www.dradio.de/dlr/sendungen/merkmal/347464/>) Archived (<https://web.archive.org/web/20080310122030/http://www.dradio.de/dlr/sendungen/merkmal/347464/>) 10 March 2008 at the Wayback Machine.
88. Boog 2001, p. 361,362.
89. Hooton Vol 2 2007, p. 52.

90. Hinchliffe, 2000. p. 42
91. *Van Nul tot Nu Deel 3-De vaderlandse geschiedenis van 1815 tot 1940* Page 42, Square 2- by Thom Roep and Co Loerakker ISBN 90-5425-098-4
92. Boog 2001, p. 361
93. The Milwaukee Journal, Monday 20 May 1940
94. St Petersburg Times, Wednesday 17 July 1940
95. Maass, Walter B., *The Netherlands at War: 1940–1945*, Abelard-Schuman, New York, 1970, pp. 38–40.
96. Kennett, Lee, *A History of Strategic Bombing*, Charles Scribner's Sons, New York, 1982, p.112.
97. Boyne, Walter J., *Clash of Wings: World War II in the Air*, Simon & Schuster, New York, 1994, p.61.
98. Hastings 1979, p. 6
99. Boog 2001, p. 362.
100. "National Archives 15 May 1940 CAB 65/13/9" ([http://www.nationalarchives.gov.uk/documentsonline/details-result.asp?queryType=1&resultcount=1&Edoc\\_Id=7965861](http://www.nationalarchives.gov.uk/documentsonline/details-result.asp?queryType=1&resultcount=1&Edoc_Id=7965861)). Nationalarchives.gov.uk. Retrieved 1 November 2015.
101. Jane's, 1989. p. 34
102. Richards 1953, p.124.
103. Hinchliffe, 2000. p. 44
104. Hinchliffe, 2000. pp. 44–45
105. "Als die ersten Bomben fielen" (<http://www.abendblatt.de/daten/2003/07/21/188453.html>) *Hamburger Abendblatt*
106. Paul Martin, "Invisibles vainqueurs: exploits et sacrifice de l'Armée de l'air en 1939–1940", 1990, p.345 [1] (<https://books.google.com/books?id=iklpAQAAQAAJ&q=jules+verne+1940+7+june+2,800kg&dq=jules+verne+1940+7+june+2,800kg&hl=fr&sa=X&ved=0CB4Q6AEwAGoVChMlvcSgs66lxwlVhegsCh0VVgtX>)
107. British Military Aviation in 1940 – Part 4 ([http://www.rafmuseum.org.uk/milestones-of-flight/british\\_military/1940\\_4.cfm](http://www.rafmuseum.org.uk/milestones-of-flight/british_military/1940_4.cfm)) Archived ([https://web.archive.org/web/20110828081217/http://www.rafmuseum.org.uk/milestones-of-flight/british\\_military/1940\\_4.cfm](https://web.archive.org/web/20110828081217/http://www.rafmuseum.org.uk/milestones-of-flight/british_military/1940_4.cfm)) 28 August 2011 at the Wayback Machine.
108. "Naval Events, 1–14 July 1940" (<http://www.naval-history.net/xDKWW2-4007-20JUL01.htm>). Naval-history.net. Retrieved 1 November 2015.
109. "Grenzlanduniversität" (<http://www.aleph99.org/etusci/ks/t2a7.htm>). Aleph99.org. Retrieved 1 November 2015.
110. 1940 (<http://www.lexikon-der-wehrmacht.de/Chronik/1940.htm>) Archived (<https://web.archive.org/web/20110807045909/http://www.lexikon-der-wehrmacht.de/Chronik/1940.htm>) 7 August 2011 at the Wayback Machine.
111. Overy 2013, pp. 71–72.
112. Wood and Dempster, 2003. p. 117.
113. Overy 2001, pp. 61–62.
114. "Great Air Battles: The Battle of Britain" (<http://info-poland.buffalo.edu/britain/airbattle.html>). Info-poland.buffalo.edu. Retrieved 1 November 2015.
115. SC Military Museum (<http://www.scguard.com/museum/ww23940.html>) Archived (<https://web.archive.org/web/20090331163545/http://www.scguard.com/museum/ww23940.html>) 31 March 2009 at the Wayback Machine.
116. Quester, George "Bargaining and Bombing During World War II in Europe", *World Politics*, Vol. 15, No. 3 (Apr. 1963), pp. 421, 425. Published by: The Johns Hopkins University Press
117. Wood and Dempster, 2003. p. 122.
118. Overy 2001, pp. 56–57, 61–62.
119. Overy 2013, pp. 82–85.
120. Royal Air Force, "Phase 2 – Pressure grows" (<http://www.raf.mod.uk/Bob1940/phase2.html>) *The Battle of Britain*
121. John Ray, *The Night Blitz*, chapter "Choosing London", pages 101–102.
122. Overy 2013, pp. 82–83.
123. Quester, George "Bargaining and Bombing During World War II in Europe", *World Politics*, Vol. 15, No. 3 (Apr. 1963), pp. 426. Published by: The Johns Hopkins University Press

124. [Wings Over Wairarapa](http://www.wairarapa.co.nz/times-age/weekly/2001/wings.html) (<http://www.wairarapa.co.nz/times-age/weekly/2001/wings.html>) Archived (<https://web.archive.org/web/20081017221217/http://www.wairarapa.co.nz/times-age/weekly/2001/wings.html>) 17 October 2008 at the Wayback Machine.
125. BBC – History – British Bombing Strategy in World War Two ([http://www.bbc.co.uk/history/worldwars/wwtwo/area\\_bombing\\_02.shtml](http://www.bbc.co.uk/history/worldwars/wwtwo/area_bombing_02.shtml)) Archived ([https://web.archive.org/web/20090825061621/http://www.bbc.co.uk/history/worldwars/wwtwo/area\\_bombing\\_02.shtml](https://web.archive.org/web/20090825061621/http://www.bbc.co.uk/history/worldwars/wwtwo/area_bombing_02.shtml)) 25 August 2009 at the Wayback Machine.
126. Richard Overy *The Battle* Chapter "The Battle" pages 82–83
127. Der alliierte Luftkrieg – TEIL IV (<http://www.wfg-gk.de/geschichte7c.html>) Archived (<https://web.archive.org/web/20121230225318/http://www.wfg-gk.de/geschichte7c.html>) 30 December 2012 at the Wayback Machine.
128. "Luftkrieg" (<http://www.nikolaiviertel-berlin.de/pages/geschichte/luftkrieg.php>) (in German).
129. "World War II Resource Pack" (<http://www.rafmuseum.org.uk/cosford/learning/resources/WWII%20Resource%20Pack.pdf>) (PDF). *RAF Museum Cosford Learning Resources*. Retrieved 18 April 2009.
130. Smith&Creek, 2004. Volume II. p. 122
131. Schmidt-Klingenbergs, Michael. "Wir werden sie ausradieren" (<http://www.spiegel.de/spiegelspecial/0,1518,290080-3,00.html>) Spiegel Online
132. "The Role of Bombing in World War II" ([http://www.centennialofflight.gov/essay/Air\\_Power/Bombing/AP27.htm](http://www.centennialofflight.gov/essay/Air_Power/Bombing/AP27.htm)).
133. Ray, John, "The Night Blitz", Cassel & Co 1996, [ISBN 0-304-35676-X](#) p.103
134. Collier, 1957. p. 261
135. Boog 2001, p. 365.
136. Ray, John, "The Night Blitz", Cassel & Co 1996, [ISBN 0-304-35676-X](#) p.236-241
137. Edited by Horst Boog, [Werner Rahn](#), Reinhard Stumpf, and [Bernd Wegner](#), "Germany and the Second World War: Volume VI The Global War", Oxford University Press, (2001), [ISBN 0-19-822888-0](#), pp 507–508
138. [RAF staff 2005, Campaign Diary 1940](#) ([http://webarchive.nationalarchives.gov.uk/20070706011932/http://www.raf.mod.uk/bombercommand/diary1940\\_2.html](http://webarchive.nationalarchives.gov.uk/20070706011932/http://www.raf.mod.uk/bombercommand/diary1940_2.html))
139. Horst Boog, "Germany and the Second World War: The global war", p 509
140. Trigg, "The Defeat of the Luftwaffe" 2016, p. 52-56
141. Griehl, Manfred and Dressel, Joachim (1998). *Heinkel He 177-277-274*. Shrewsbury, England: Airlife Publishing. p. 53.
142. Griehl, Manfred and Dressel, Joachim (1998). *Heinkel He 177-277-274*. Shrewsbury, England: Airlife Publishing. p. 52.
143. Griehl, Manfred and Dressel, Joachim (1998). *Heinkel He 177-277-274*. Shrewsbury, England: Airlife Publishing. p. 165.
144. Price, 2005. p. 195.
145. (in Czech) (in German) Jakub Skalický (14 October 2007). "[Hitlerův rozkaz k zahájení "baedekerových" náletů](http://www.fronta.cz/dokument/hitleruv-rozkaz-k-zahajeni-%22baedekerovych%22-naletu)" (<http://www.fronta.cz/dokument/hitleruv-rozkaz-k-zahajeni-baedekerovych-naletu>). www.fronta.cz. Retrieved 20 April 2009.
146. Hayward 2001, p. 117.
147. [Hooton 2016](#), p. 68.
148. [Hooton 2016](#), p. 121.
149. "Why did the RAF bomb cities?" (<http://www.nationalarchives.gov.uk/education/worldwar2/theatres-of-war/western-europe/investigation/hamburg/sources/docs/6/>). *World War I: Western Europe 1939–1945: Hamburg*. The National Archives. Retrieved 2 January 2012.
150. Max Hastings, *Bomber Command* (1979) pp 371–2
151. Harris, Arthur Travers (1995). *Despatch on war operations, 23rd February, 1942, to 8th May, 1945* (<https://books.google.com/books?id=jzzl8wUr52cC&pg=PA7>). Cass Series: Studies in Air Power. 3. Psychology Press. p. 7. [ISBN 978-0-7146-4692-3](#).
152. Levine 1992, p. 39.
153. Longmate 1983, p.133

154. Copp 1996.
155. "Issues : Singleton – World War Two" (<http://www.valourandhorror.com/BC/Issues/Singletn.php>). Valourandhorror.com. Retrieved 1 November 2015.
156. This was the sole attempt to analyse Bomber Command policy during the war. *Ethics and Airpower*.
157. *Ethics and Airpower*.
158. Levine 1992, p. 36.
159. Tooze 2002, pp. 597–598.
160. Tooze 2002, p. 602.
161. Denson 1999, p. 352.
162. Garret 1993, pp. 32–33.
163. Sokolski 2004, p. 36.
164. Strategic Bombing Survey summary report ([http://www.ibiblio.org/hyperwar/AAF/USSBS/ETO-Summary.html#taotra\\_w%22](http://www.ibiblio.org/hyperwar/AAF/USSBS/ETO-Summary.html#taotra_w%22)), pp.12–13.
165. Vogels, Fred. "RAF Bomber Command 748 Lancasters record attack (Dortmund) 12 March 1945" (<https://www.backtonormandy.org/the-history/air-force-operations/airplanes-in-actions/lancaster/raf-bomber-command-748-lancasters-record-attack-dortmund-12-march-1945.html>). backtonormandy.org. Retrieved 16 April 2017.
166. US Strategic Bombing Survey: Statistical Appendix to Overall report (European War) (Feb 1947) table 1
167. Harris, Arthur Travers, ed Cox, Sebastian (1995). *Despatch on War Operations: 23 February 1942, to 8th May, 1945*, Routledge, ISBN 0-7146-4692-X. p.196 ([https://books.google.com/books?id=jzzl8wUn52cC&pg=PA194&lpg=PA194&dq=S.46368&source=web&ots=CZivLuVvkQ&sig=JQblrT0zoON5wZ6eKD5zhOeVN2k&hl=en&sa=X&oi=book\\_result&resnum=1&ct=result#PPA196,M1](https://books.google.com/books?id=jzzl8wUn52cC&pg=PA194&lpg=PA194&dq=S.46368&source=web&ots=CZivLuVvkQ&sig=JQblrT0zoON5wZ6eKD5zhOeVN2k&hl=en&sa=X&oi=book_result&resnum=1&ct=result#PPA196,M1))
168. Richard G Davis *American Bombardment Policy against Germany, 1942–1945*, Air Power Review, Volume 6 Number 3, pp. 49–62. (see p. 54 (PDF 63) ([http://www.raf.mod.uk/rafcms/mediafiles/497EBDC6\\_1143\\_EC82\\_2E260662250E094B.pdf](http://www.raf.mod.uk/rafcms/mediafiles/497EBDC6_1143_EC82_2E260662250E094B.pdf))). Retrieved 4 March 2010
169. United States Strategic Bombing Survey
170. Norman Longmate, *The Bombers: The RAF Offensive against Germany 1939–1945*, pp.309–312
171. "MILANO in "Enciclopedia Italiana – II Appendice" – Treccani" ([http://www.treccani.it/enciclopedia/milano\\_res-6913b8a2-87e6-11dc-8e9d-0016357eee51\\_\(Enciclopedia-Italiana\)/](http://www.treccani.it/enciclopedia/milano_res-6913b8a2-87e6-11dc-8e9d-0016357eee51_(Enciclopedia-Italiana)/)). Treccani.it. Retrieved 1 November 2015.
172. "Documento senza titolo" ([http://www.torinoinguerra.it/scheda\\_parola.asp?ID=10](http://www.torinoinguerra.it/scheda_parola.asp?ID=10)). Torinoinguerra.it. Retrieved 1 November 2015.
173. <http://www.istoreto.it/torino38-45/download/torino38-45.pdf>
174. "SPEZIA, La in "Enciclopedia Italiana – II Appendice" – Treccani" ([http://www.treccani.it/enciclopedia/la-spezia\\_res-eb3fb1e6-87e6-11dc-8e9d-0016357eee51\\_\(Enciclopedia-Italiana\)/](http://www.treccani.it/enciclopedia/la-spezia_res-eb3fb1e6-87e6-11dc-8e9d-0016357eee51_(Enciclopedia-Italiana)/)). Treccani.it. Retrieved 1 November 2015.
175. "Bombardamenti aerei subiti da Bologna – Storia e Memoria di Bologna" (<http://memoriadibologna.comune.bologna.it/bombardamenti-aerei-subiti-da-bologna-95-evento>). Memoriadibologna.comune.bologna.it. Retrieved 1 November 2015.
176. <http://www.giuliocesaro.it/pdf/storici/012%20Bombardamenti%20aerei%20Padova.pdf>
177. "RIMINI in "Enciclopedia Italiana – II Appendice" – Treccani" ([http://www.treccani.it/enciclopedia/rimini\\_res-c2072ce3-87e6-11dc-8e9d-0016357eee51\\_\(Enciclopedia-Italiana\)/](http://www.treccani.it/enciclopedia/rimini_res-c2072ce3-87e6-11dc-8e9d-0016357eee51_(Enciclopedia-Italiana)/)). Treccani.it. Retrieved 1 November 2015.
178. "TREVISO in "Enciclopedia Italiana – II Appendice" – Treccani" ([http://www.treccani.it/enciclopedia/treviso\\_res-0707d147-87e7-11dc-8e9d-0016357eee51\\_\(Enciclopedia-Italiana\)/](http://www.treccani.it/enciclopedia/treviso_res-0707d147-87e7-11dc-8e9d-0016357eee51_(Enciclopedia-Italiana)/)). Treccani.it. Retrieved 1 November 2015.
179. "Così il 10 giugno '44 Trieste si svegliò sotto le bombe – Cronaca – Il Piccolo" (<http://ilpiccolo.gelocal.it/trieste/cronaca/2014/06/14/news/così-il-10-giugno-44-trieste-si-sveglia-sotto-le-bombe-1.9423562>). Ilpiccolo.gelocal.it. 2014-06-14. Retrieved 1 November 2015.
180. di Gabriella Galbiati (2015-06-22). "I bombardamenti tedeschi su Napoli – 1943" (<http://www.tesionline.it/v2/appunto-sub.jsp?p=8&id=703>). Tesionline.it. Retrieved 1 November 2015.
181. "MESSINA in "Enciclopedia Italiana – II Appendice" – Treccani" ([http://www.treccani.it/enciclopedia/messina\\_res-65875d60-87e6-11dc-8e9d-0016357eee51\\_\(Enciclopedia-Italiana\)/](http://www.treccani.it/enciclopedia/messina_res-65875d60-87e6-11dc-8e9d-0016357eee51_(Enciclopedia-Italiana)/)). Treccani.it. Retrieved 1 November 2015.

182. "TRAPANI in "Enciclopedia Italiana – Il Appendice" – Treccani" ([http://www.treccani.it/enciclopedia/trapani\\_res-0622ef36-87e7-11dc-8e9d-0016357eee51\\_\(Enciclopedia-Italiana\)./](http://www.treccani.it/enciclopedia/trapani_res-0622ef36-87e7-11dc-8e9d-0016357eee51_(Enciclopedia-Italiana)./)). Treccani.it. Retrieved 1 November 2015.
183. "AGinox" ([http://aginox.greenconsulting.it/ita/operemonumentali.html?ID\\_prod=40](http://aginox.greenconsulting.it/ita/operemonumentali.html?ID_prod=40)). Aginox.greenconsulting.it. Retrieved 1 November 2015.
184. "31 agosto 1943" (<http://www.pisainformaflash.it/notizie/archivio/dettaglio.html?nId=1850>). Pisainformaflash.it. Retrieved 1 November 2015.
185. Massimo Coltrinari (2014). *Il corpo italiano di liberazione e Ancona: Il tempo delle oche verdi e del lardo rosso. Il passaggio del fronte: giugno-luglio 1944* (<https://books.google.com/books?id=t7fzAwAAQBAJ&pg=PA131>). Edizioni Nuova Cultura. p. 131. ISBN 978-88-6812-322-2.
186. [http://www.bibliotecaviterbo.it/biblioteca-e-societa/1997\\_3/inserto.pdf](http://www.bibliotecaviterbo.it/biblioteca-e-societa/1997_3/inserto.pdf)
187. Richards 1995, pp. 84–87.
188. "The Bombing of France 1940–1945 Exhibition" (<http://centres.exeter.ac.uk/wss/bombing/britainexhibition/france.htm#bombing>). Bombing, States and Peoples in Western Europe, 1940–1945. University of Exeter Centre for the Study of War, State and Society. Retrieved 15 July 2012.
189. Eddy Florentin, "Quand les alliés bombardaien la France, 1940–1945", Perrin, Paris, 2008.
190. Horst Boog; Derry Cook-Radmore, trans., "Part I: The Strategic Air War in Europe and Air Defence of the Reich, 1943–44", in *Germany and the Second World War, Volume VII: The Strategic Air War in Europe and the War in the West and East Asia, 1943–44/5* (Oxford: Oxford University Press, 2006 [Stuttgart: Deutsche Veralgs-Anstalt GmbH, 2005]), 153–58.
191. Buckley 1998, p. 166.
192. Kershaw 1987, pp. 206–207.
193. British Bombing Survey Unit (BBSU) Report, p.41, paras 137-8, corroborated in United States Strategic Bombing Survey (USSBS) report No.31, *The attack on German cities* (Washington, D.C.: Government Printing Office, 1945); Noble, Frankland, *The Bombing Offensive Against Germany: Outlines and Perspectives*, London: Faber 1965, p.114;
194. Hastings, p. 352, quoting German post-war Statistical Office calculations.
195. Baldoli, Claudia; Knapp, Andrew (12 April 2012). "Forgotten Blitzes: France and Italy Under Allied Air Attack, 1940–1945" ([https://books.google.com/books?id=CFc4K-vPfHUC&pg=PA2&lpg=PA2&dq=bomb%20tonnage%20dropped%20on%20italy&source=bl&ots=l67LOKI36o&sig=xL1r5NP\\_4QB6GtX0c-Ksmgus8T8&hl=it&sa=X&ved=0CD0Q6AEwBGoVChMImM2TzovoyAIVQ74UCH3-YgMu#v=snippet&q=tons&f=false](https://books.google.com/books?id=CFc4K-vPfHUC&pg=PA2&lpg=PA2&dq=bomb%20tonnage%20dropped%20on%20italy&source=bl&ots=l67LOKI36o&sig=xL1r5NP_4QB6GtX0c-Ksmgus8T8&hl=it&sa=X&ved=0CD0Q6AEwBGoVChMImM2TzovoyAIVQ74UCH3-YgMu#v=snippet&q=tons&f=false)). A&C Black. Retrieved 16 April 2017 – via Google Books.
196. Humble, Richard (1975). *War in the Air 1939–1945*. London: Salamander. OCLC 4248555 (<https://www.worldcat.org/oclc/4248555>).
197. Richard Overy, *The Bombers and the Bombed: Allied Air War Over Europe 1940–1945* (2014) pp 306–7
198. "Part Two the Yugoslav Campaign" ([http://www.history.army.mil/books/wwii/balkan/20\\_260\\_2.htm](http://www.history.army.mil/books/wwii/balkan/20_260_2.htm)). *THE GERMAN CAMPAIGN IN THE BALKANS (SPRING 1941)* (<http://www.history.army.mil/books/wwii/balkan/intro.htm>). United States Army Center of Military History. 1986 [1953]. CMH Pub 104-4. Retrieved 7 July 2009.
199. Ian Dear, Michael Richard Daniell Foot (2001). *The Oxford companion to World War II* (<https://books.google.com/books?id=qC0OgOHAHVkC&pg=&dq=&hl=en#v=onepage&q=&f=false>). Oxford University Press. p.837. ISBN 0-19-860446-7
200. Marco Gioannini, Giulio Massobrio, *Bombardate l'Italia. Storia della guerra di distruzione aerea 1940–1945*, p. 492
201. Kenneth K. Hatfield (2003). "Heartland heroes: remembering World War II. (<https://books.google.com/books?id=mtxMN5NdmCsC&pg=RA1-PA91&lpg=RA1-PA91&dq=&hl=en#v=onepage&q=&f=false>)". p.91.
202. The Illustrated London News, Marching to War 1933–1939, Doubleday, 1989, p.135
203. E. Bruce Reynolds, *Thailand's Secret War: The Free Thai, OSS, and SOE During World War II* (Cambridge University Press, 2005), 354 n. 68.
204. Reynolds, *Thailand's Secret War*, 431.
205. David G. Marr, *Vietnam 1945: The Quest for Power* (University of California Press, 1995), 271–74.
206. Marr, *Vietnam 1945*, 401.

207. Caidin, Martin. *A Torch to the Enemy: The Fire Raid on Tokyo*, Bantam War Books, 1960. [ISBN 0-553-29926-3](#) pp.??
208. Bradley, F. J. *No Strategic Targets Left*. "Contribution of Major Fire Raids Toward Ending WWII", Turner Publishing Company, limited edition. [ISBN 1-56311-483-6](#). p. 38.
209. Kaplan, Fred (1983). *The Wizards of Armageddon*. New York: Simon and Schuster. [ISBN 978-0-671-42444-2](#) p.42 (<https://books.google.com/books?id=yJXu7kMSc44C&pg=PA42&lpg=PP1&ots=wcTdejLOdT&dq=The+Wizards+of+Armageddon>)
210. Kaplan, Fred (1983). *The Wizards of Armageddon*. New York: Simon and Schuster. [ISBN 978-0-671-42444-2](#) p.43 (<https://books.google.com/books?id=yJXu7kMSc44C&pg=PA43&lpg=PP1&ots=wcTdejLOdT&dq=The+Wizards+of+Armageddon>)
211. "9 March 1945: Burning the Heart Out of the Enemy" (<https://www.wired.com/thisdayintech/2011/03/0309incendiary-bombs-kill-100000-tokyo/>). *Wired*. Condé Nast Digital. 9 March 2011. Retrieved 8 August 2011.
212. Laurence M. Vance (14 August 2009). "Bombings Worse than Nagasaki and Hiroshima" (<http://fff.org/explore-freedom/article/bombings-worse-nagasaki-hiroshima>). *The Future of Freedom Foundation*. Retrieved 8 August 2011.
213. Spector, Ronald (1985). "Eagle Against the Sun." New York: Vintage Books. p. 503.
214. "United States Strategic Bombing Survey, Summary Report (Pacific War). 1 July 1946" (<http://www.anesi.com/usssbs01.htm>). Anesi.com. Retrieved 1 November 2015.
215. Hallion, Dr. Richard P. *Decisive Air Power Prior to 1950* (<https://www.airforcehistory.hq.af.mil/EARS/Hallionpapers/decisiveairpower1950.htm>) Air Force History and Museums Program.
216. Major John S. Chilstrom, School of Advanced Airpower Studies. *Mines Away! The Significance of U.S. Army Air Forces Minelaying in World War II*. Diane Publishing, 1992.
217. Paul Ham (2012). *Hiroshima Nagasaki* (<https://books.google.com/books?id=J7hw0x0WEz4C&pg=PA196>). Transworld. p. 196ff.
218. Herman S. Wolk (2010). *Cataclysm: General Hap Arnold and the Defeat of Japan* ([https://books.google.com/books?id=\\_yYcGP53d0ngC&pg=PA174](https://books.google.com/books?id=_yYcGP53d0ngC&pg=PA174)). University of North Texas Press. p. 174.
219. Truman later said he gave the order, but there is no written evidence he did so says Tsuyoshi Hasegawa (2009). *Racing the Enemy: Stalin, Truman, and the Surrender of Japan* (<https://books.google.com/books?id=iPju1MrqgU4C&pg=PA152>). Harvard University Press. p. 152.
220. "Frequently Asked Questions #1" ([http://www.rerf.or.jp/general/qa\\_e/qa1.html](http://www.rerf.or.jp/general/qa_e/qa1.html)). Radiation Effects Research Foundation. Archived ([https://web.archive.org/web/20070919143939/http://www.rerf.or.jp/general/qa\\_e/qa1.html](https://web.archive.org/web/20070919143939/http://www.rerf.or.jp/general/qa_e/qa1.html)) from the original on 19 September 2007. Retrieved 18 September 2007.
221. Beyond the nuclear freeze, page 145, Robert F. Drinan, Seabury Press
222. *Nuke-Rebuke: Writers & Artists Against Nuclear Energy & Weapons* (The Contemporary anthology series). The Spirit That Moves Us Press. 1 May 1984. pp. 22–29.
223. Robert Hull (11 October 2011). *Welcome To Planet Earth – 2050 – Population Zero*. AuthorHouse. p. 215. [ISBN 1-4634-2604-6](#).
224. Philip A. Seaton (2007). *Japan's Contested War Memories: The 'Memory Rifts' in Historical Consciousness of World War II* (<https://books.google.com/books?id=tZVPTe424X4C&pg=PA91>). Routledge. p. 91.

## Sources

- Boog, Horst (2006). *The Strategic Air War in Europe and the War in the West and East Asia, 1943–1944/5*. Germany and the Second World War. VII. Oxford University Press. [ISBN 978-0-19-822889-9](#).
- Bradley, F. J. (1999) *No Strategic Targets Left*. "Contribution of Major Fire Raids Toward Ending WWII", Turner Publishing. [ISBN 1-56311-483-6](#).
- Buckley, John (1998). *Air Power in the Age of Total War*. UCL Press. [ISBN 1-85728-589-1](#).
- Caidin, Martin (1960). *A Torch to the Enemy: The Fire Raid on Tokyo*. Bantam War Books. [ISBN 0-553-29926-3](#).
- Copp, Terry. *The Bomber Command Offensive* (<https://web.archive.org/web/20070927223119/http://www.legionmagazine.com/features/canadianmilitaryhistory/96-09.asp>) at the *Wayback Machine* (archived 27 September 2007),

originally published in the *Legion Magazine* September/October 1996

- Collier, Basil. *The Defence of the United Kingdom*. HMSO, 1957. OCLC 59930716 (<https://www.worldcat.org/oclc/59930716>)
- Corum, James. (2007). *The Luftwaffe: The Operational Air War, 1918–1940*. University of Kansas Press. ISBN 0-7006-0836-2
- Corum, James S. (2013). "The Luftwaffe's Campaigns in Poland and the West 1939–1940: A Case Study of Handling Innovation in Wartime". *Security and Defence Quarterly* (1): 158–189. doi:10.5604/23008741.1191778 (<https://doi.org/10.5604%2F23008741.1191778>).
- Davis, Richard G. (2006) *Bombing the European Axis Powers. A Historical Digest of the Combined Bomber Offensive 1939–1945* ([https://web.archive.org/web/20090305023036/http://aupress.au.af.mil/Books/Davis/Davis\\_B99.pdf](https://web.archive.org/web/20090305023036/http://aupress.au.af.mil/Books/Davis/Davis_B99.pdf)) at the [Wayback Machine](#) (archived 5 March 2009) Air University Press.
- Garrett, Stephen (1993). *Ethics and Airpower in World War II*. New York: St. Martin's Press. ISBN 978-0-312-08683-1.
- Grafton, Brian. *Bomber Command* (<https://web.archive.org/web/20061209202129/http://www.militaryhistoryonline.com/wwii/bombercommand/bombercommand.aspx>) at the [Wayback Machine](#) (archived 9 December 2006) on the website Military History Online
- Grayling, A. C. (2006). *Among the Dead Cities*. London: Bloomsbury. ISBN 978-0-7475-7671-6.
- Green, William (1967). *War Planes of the Second World War: Bombers*. VIII. London: Macdonald.
- Hall, Cargill (1998). *Case Studies in Strategic Bombardment*. Air Force History and Museums Program. ISBN 0-16-049781-7.
- Hallion, Richard P. *Decisive Air Power Prior to 1950* (<https://www.airforcehistory.hq.af.mil/EARS/Hallionpapers/decisiveairpower1950.htm>) USAF History and Museums Program.
- Hastings, Max (1979). *RAF Bomber Command*. Pan Books. ISBN 0-330-39204-2
- Hinchcliffe, Peter (1996) *The other battle : Luftwaffe night aces versus Bomber Command*. Airlife Publishing, ISBN 978-1-85310-547-0
- Hooton, E.R (1994). *Phoenix Triumphant; The Rise and Rise of the Luftwaffe*. London: Arms & Armour Press. ISBN 1-86019-964-X
- Hooton, E.R (1997). *Eagle in Flames; The Fall of the Luftwaffe*. London: Arms & Armour Press. ISBN 1-86019-995-X
- Hooton, E.R (2007). *Luftwaffe at War; Blitzkrieg in the West: Volume 2*. London: Chervron/Ian Allen. ISBN 978-1-85780-272-6.
- Hooton, E.R. (2016). *War over the Steppes: The air campaigns on the Eastern Front 1941–45*. Osprey. ISBN 978-1-47281562-0.
- Jane's (1989). *All the World's Aircraft 1940/41/42/43/44/45*. London, Random House, ISBN 1-85170-199-0
- Levine, Alan J. (1992). *The Strategic Bombing of Germany, 1940–1945* (<https://www.questia.com/PM.qst?a=o&d=15370919>). Greenwood. ISBN 978-0-275-94319-6.
- Longmate, Norman. (1983) *The Bombers*. Hutchinson. ISBN 0-09-151580-7.
- Murray, Williamson (1983). *Strategy for Defeat: The Luftwaffe 1933–1945* (<http://aupress.au.af.mil/bookinfo.asp?bid=72>). Maxwell AFB: Air University Press. ISBN 978-1-58566-010-0.
- Nelson, Hank (2003). *A different war: Australians in Bomber Command* (<http://www.awm.gov.au/events/conference/2003/nelson.asp>) paper presented at the 2003 History Conference – Air War Europe
- Nelson, Hank (2006). *Chased by the Sun: The Australians in Bomber Command in World War II*, Allen & Unwin, ISBN 1-74114-847-2, ISBN 978-1-74114-847-3
- Overy, Richard J. (1980) *The Air War Stein and Day*. ISBN 978-1-57488-716-7
- Overy, Richard J. (2001). *The Battle of Britain: The Myth and the Reality*. New York: W.W. Norton. ISBN 0-393-02008-8. (hardcover, ISBN 0-393-32297-1 paperback, 2002)
- Overy, Richard J. (2013). *The Bombing War : Europe 1939–1945*. London & New York: Allen Lane. ISBN 978-0-7139-9561-9.
- Poeppel, Hans and Prinz von Preußen, Wilhelm-Karl and von Hase, Karl-Günther. (2000) *Die Soldaten der Wehrmacht*. Herbig Verlag. ISBN 978-3-7766-2057-3

- Price, Alfred. *Kampfflieger -Bombers of the Luftwaffe January 1942-Summer 1943, Volume 3.* 2005, Classic Publications. [ISBN 978-1-903223-49-9](#)
- Hansen, Randall (2008). *Fire and Fury: The Allied Bombing of Germany, 1942–1945.* Toronto: Doubleday Canada. [ISBN 978-0-385-66403-5](#).
- RAF staff (6 April 2005). *Bomber Command Campaign Diary* (<http://webarchive.nationalarchives.gov.uk/20070706011932/http://www.raf.mod.uk/bombercommand/diary.html>). Royal Air Force Bomber Command 60th Anniversary. Archived from the original (<http://www.raf.mod.uk/bombercommand/diary.html>) on 6 July 2007.
- Ray, John. *The Night Blitz.* Booksales. [ISBN 978-0-7858-1601-0](#).
- Richards, Denis (1953). *The Fight at Odds* (<http://ftp.ibiblio.org/hyperwar/UN/UK/UK-RAF-I/index.html>). Royal Air Force 1939–1945. I. London: Her Majesty's Stationery Office.
- Richards, Denis. *The Hardest Victory: RAF Bomber Command in the Second World War.* London: Coronet, 1995. [ISBN 0-340-61720-9](#).
- R.J. Rummel. Was World War II American Urban Bombing Democide? (<http://www.hawaii.edu/powerkills/COMM.10.5.03.HTM>)
- Sherwood Ross. How the United States Reversed Its Policy on Bombing Civilians (<https://www.questia.com/PM.qst;jsessionid=Ghnf6snwpKN25PLvNs8zNvQDtSXN2pgwTcR4f5YB7W0LdQ183Ghv!68860294!509813057?a=o&d=5009994090>), *The Humanist*, Vol. 65, July–August 2005
- Smith, J. Richard and Creek, Eddie J. (2004). *Kampfflieger. Vol. 2.: Bombers of the Luftwaffe July 1940 – December 1941.* Classic Publications. [ISBN 978-1-903223-42-0](#)
- Smith, J. Richard and Creek, Eddie J. (2004). *Kampfflieger. Vol. 2.: Bombers of the Luftwaffe July 1940 – December 1941.* Classic Publications. [ISBN 978-1-903223-43-7](#)
- Spaight, James M. Bombing Vindicated (<https://archive.org/details/BombingVindicated>) Geoffrey Bles, London 1944. ASIN: B0007IVW7K (Spaight was Principal Assistant Secretary of the British Air Ministry)
- Spector, Ronald (1985). *Eagle Against the Sun.* Vintage Books. [ISBN 978-0-394-74101-7](#)
- Speidel, Wilhelm (1956). The Luftwaffe in the Polish Campaign of 1939 (<http://www.afhra.af.mil/studies/numberedusafhistoricalstudies151-200.asp>). Montgomery, Alabama: Air Force Historical Research Agency.
- Taylor, Frederick (2005). *Dresden: Tuesday, 13 February 1945.* London: Bloomsbury. [ISBN 0-7475-7084-1](#).
- Saward, Dudley. (1985) *Bomber Harris.* Doubleday. [ISBN 978-0-385-11258-1](#)
- United States Strategic Bombing Survey. Summary Report (Pacific War) (<http://www.anesi.com/ussbs01.htm>) 1 July 1946.
- United States Strategic Bombing Survey. Summary Report (European War) (<http://www.anesi.com/ussbs02.htm>) 30 September 1945.
- United States Strategic Bombing Survey. The Defeat of the German Air Force. (<http://www.allworldwars.com/The%20Defeat%20of%20the%20German%20Air%20Force.html>) 1947.
- United States Strategic Bombing Survey. *The Effects of Strategic Bombing on German Transportation.* 1947.
- United States Strategic Bombing Survey. *The Effects of Strategic Bombing on the German War Economy.* 1945.
- Willmott, H.P. (1991). *The Great Crusade.* Free Press, 1991. [ISBN 978-0-02-934716-4](#)
- Wood & Dempster (1990) *The Narrow Margin Chapter "Second Phase"* [ISBN 978-0-87474-929-8](#)
- Wood, Derek and Dempster, Derek. (1990). *The Narrow Margin: The Battle of Britain and the Rise of Air Power,* London: Tri-Service Press, third revised edition. [ISBN 1-85488-027-6](#).
- Young, Kevin. "The Path to Hiroshima and Nagasaki – Targeting Civilians" (<http://www.counterpunch.org/young08092008.html>), CounterPunch, 9–10 August 2008

## Further reading

- Childers, Thomas (2008). "Facilis descensus averni est: The Allied Bombing of Germany and the Issue of German Suffering". *Central European History.* 38: 75. doi:10.1163/1569161053623624 (<https://doi.org/10.1163%2F1569161053623624>). ISSN 1569-1616 (<https://www.worldcat.org/issn/1569-1616>).

- Clodfelter, Mark. "Aiming to Break Will: America's World War II Bombing of German Morale and its Ramifications", *Journal of Strategic Studies*, June 2010, Vol. 33#3 pp 401–435, doi:10.1080/01402390903189436 (<https://doi.org/10.1080%2F01402390903189436>)
- Coffey, Thomas M. (1977). *Decision over Schweinfurt*. New York: Doubleday. **ISBN 978-0-679-50763-5**.
- Coffey, Thomas M. (1982). *HAP: The Story of the U.S. Air Force and the Man who Built It*, General Henry H. "Hap" Arnold. New York: Viking Press. **ISBN 978-0-670-36069-7**.
- Coffey, Thomas M. (1987). *Iron Eagle : The Turbulent Life of General Curtis LeMay*. Random House Value publishing. **ISBN 0-517-55188-8**.
- Crane, Conrad C. *American Airpower Strategy in World War II: Bombs, Cities, Civilians, and Oil* (2016).
- Crane, Conrad C. *Bombs, Cities, and Civilians: American Airpower Strategy in World War II* (1993).
- Craven, Wesley F.; Cate, James Lea (1948–1958). *The Army Air Forces in World War II, volumes 1–8*. Chicago: University of Chicago Press. **ISBN 978-0-405-12137-1**.
- Garretsen, Harry; Schramm, Marc; Brakman, Steven. *The Strategic Bombing of German Cities during World War II and its Impact for Germany* (<http://www.uu.nl/content/03-09i.pdf>) (PDF). Discussion Paper Series nr: 03-09. Tjalling, C. Koopmans Research Institute, Utrecht School of Economics, Utrecht University.
- Great Britain Air Ministry (1983). *The Rise and Fall of the German Air Force*. Arms and Armour Press. **ISBN 978-0-85368-560-9**.
- Greer, Ron (2005). *Fire from the Sky: A Diary Over Japan*. Jacksonville, Arkansas, U.S.A.: Greer Publishing. **ISBN 0-9768712-0-3**.
- Guillain, Robert (1982). *I Saw Tokyo Burning: An Eyewitness Narrative from Pearl Harbor to Hiroshima*. Jove Pubns. **ISBN 0-86721-223-3**.
- Hansell, Haywood S. *The Strategic Air War Against Germany and Japan: A Memoir* (1986) online ([https://ia601305.us.archive.org/14/items/StrategicAirWarAgainstGermanyJapan-nsia/StrategicAirWarAgainstGermanyJapan\\_text.pdf](https://ia601305.us.archive.org/14/items/StrategicAirWarAgainstGermanyJapan-nsia/StrategicAirWarAgainstGermanyJapan_text.pdf))
- Harris, Arthur (1998). *Bomber Offensive*. Greenhill Books/Lionel Leventhal. **ISBN 978-1-85367-314-6**.
- Hastings, Max (1979). *Bomber Command*. New York: Dial. **ISBN 978-0-7181-1603-3**.
- Hayward, Joel S.A. *Stopped at Stalingrad: The Luftwaffe and Hitler's Defeat in the East, 1942–1943*. University Press of Kansas, 1998. **ISBN 978-0-7006-1146-1**
- Kennet, Lee (1982). *A History of Strategic Bombing*. New York: Scribner. **ISBN 978-0-684-17781-6**.
- Lemay, Curtis E.; Yenne, Bill (1988). *Superfortress: The Story of the B-29 and American Air Power*. McGraw-Hill. **ISBN 0-07-037164-4**.
- McGowen, Tom (2001). *Air Raid!:The Bombing Campaign*. Brookfield, Connecticut, U.S.A.: Twenty-First Century Books. **ISBN 0-7613-1810-0**.
- Middlebrook, Martin; Everitt, Chris (1990). *The Bomber Command War Diaries: An Operational Reference Book, 1939–1945*. London: Penguin. **ISBN 978-0-14-012936-6**.
- Mierzejewski, Alfred (1987). *The Collapse of the German War Economy, 1944–1945* (<https://www.questia.com/PM.qs?t=a=o&d=59235941>). Chapel Hill: University of North Carolina Press. **ISBN 978-0-8078-6338-1**.
- Milward, Alan S. (1965). *The German Economy at War*. London: Prometheus Books. **ISBN 978-0-485-11075-3**.
- Patler, Nicholas. "Is the U.S. Haunted by Its Nuclear Past? Dropping the atomic bomb crossed a moral threshold." *The Progressive Christian* (Winter 2009), pp 15–19,36.
- Patler, Nicholas. "Book Reviews/Essay: A Twentieth Century History of Bombing Civilians, and A History of Bombing." *Journal of Critical Asian Studies* (March 2011), 153–156.
- Ross, Stewart Halsey (2003). *Strategic Bombing by the United States in World War II. The Myths and the Facts*. McFarland & Co. **ISBN 978-0-7864-1412-3**.
- Shannon, Donald H. (1976). *United States air strategy and doctrine as employed in the strategic bombing of Japan*. U.S. Air University, Air War College. **OCLC 2499355** (<https://www.worldcat.org/oclc/2499355>).
- Smith, Major Phillip A. *Bombing to Surrender: The contribution of air power to the collapse of Italy, 1943* (Pickle Partners Publishing, 2014).
- Verrier, Anthony (1974). *The Bomber Offensive*. New York: Pan. **ISBN 978-0-330-23864-9**.

- Spaight, James M (1944). *Bombing Vindicated* (<https://archive.org/details/BombingVindicated>). G. Bles.  
OCLC 1201928 (<https://www.worldcat.org/oclc/1201928>). – Spaight was Principal Assistant Secretary of the Air Ministry (U.K)
- Webster, Charles; Frankland, Noble (1961). *The Strategic Air Offensive against Germany, volumes 1–4*. London: Her Majesty's Stationery Office. ISBN 978-1-84574-437-3.
- Weigley, Russell (1981). *Eisenhower's Lieutenants*. Bloomington: Indiana University Press. ISBN 978-0-253-13333-5.

## External links

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- The Blitz: Sorting the Myth from the Reality ([http://www.bbc.co.uk/history/britain\\_wwtwo/blitz\\_01.shtml](http://www.bbc.co.uk/history/britain_wwtwo/blitz_01.shtml)) by BBC History
- Liverpool Blitz— Experience 24 hours in a city under fire in the Blitz (<http://www.liverpoolmuseums.org.uk/nof/blitz/>) from National Museums Liverpool
- Coventry Blitz Resource Centre (<http://www.familyresearcher.co.uk/BlitzDeaths.htm>)
- The 376th Heavy Bombardment Group Oral Histories (<http://libx.bsu.edu/collection.php?CISOROOT=376OrHis/>) at Ball State University
- Allied Bombers and Crews (<http://www.life.com/image/first/in-gallery/26102/wwii-allied-bombers-and-crewsWWII>) – slideshow by Life magazine
- Annotated bibliography for conventional bombing during World War II (<http://alsos.wlu.edu/qsearch.aspx?browse=warfare/Conventional%20Bombing>) from the Alsos Digital Library for Nuclear Issues
- The Revenger's Tragedy (<http://www.newstatesman.com/europe/2009/12/germany-air-bomber-war-bombing>) by Leo McKinstry (in New Statesman)

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